104

UNITED STATES SPACE LAUNCH STRATEGY

Y 4. SCI 2: 104/59

United States Space Launch Strategy...

HEARING

BEFORE THE

SUBCOMMITTEE ON SPACE AND AERONAUTICS

OF THE

COMMITTEE ON SCIENCE

U.S. HOUSE OF REPRESENTATIVES

ONE HUNDRED FOURTH CONGRESS

SECOND SESSION

JUNE 12, 1996

[No. 59]

Printed for the use of the Committee on Science

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**Vice Chairman

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UNITED STATES SPACE LAUNCH STRATEGY

Wednesday, June 12, 1996

U.S. HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE,
SUBCOMMITTEE ON SPACE AND AERONAUTICS,
Washington, DC.

The subcommittee met at 10:05 a.m. in Room 2318 of the Rayburn House Office Building, the Honorable Dave Weldon presiding.

Mr. Dave WELDON (Presiding). The hearing of the Subcommittee of Space and Aeronautics will come to order.

Good morning.

The Chairman, Mr. Sensenbrenner, was not able to be here this morning. He asked that I chair this meeting.

Today's hearing is about our nation's future in space. We all know federal resources for the Space Program are not as plentiful as in the past, and the commercial market will have to take the lead if the United States is to maintain its leadership in space into the 21st century.

However, our national policies are often divergent from that goal and even work against the efforts of our commercial sector.

We have policies that, on the one hand, promote unenforceable trade agreements with non-market economies and throw bureaucratic roadblocks in the way of commercial enterprises, yet, on the other hand, Congress and the Administration are supporting new and innovative programs, such as X-33, to develop the next generation's useful launch vehicle that will allow the U.S. to maintain its competitiveness in an increasingly global market.

If the Congress is confused by the national strategy in commercial space, one can imagine how the private sector feels and they are the people that will either make or break our future in space.

The International Space Launch agreements with China and Russia and the Ukraine are a perfect example of this confusing divergent thinking.

After going in with a clearly superior negotiating position, our trade representatives walked away with agreements that are virtually unenforceable and leave our domestic launch industry bare and defenseless against predatory pricing and dumping in the launch market.

I have looked long and hard at these issues and I have come to the conclusion, based on the data I have been provided with, that the agreements are not being adequately monitored or enforced, nor does there seem to be any real effort to do so.

At issue is not the merit of the launch agreements. This is about fair trade. Every launch provider I have talked to has said that

they can be competitive but only if the agreements are fully and fairly enforced.

And it seems that a Junior Senator from Tennessee agreed with me back in 1992 in a speech at the Goddard Space Flight Center.

He said, as a result of presidential policy, we have a situation where private American companies are forced to compete head to head with foreign governments to provide launch services. The Junior Senator, now Vice President Gore, was concerned that a non-market economy had access to non-geostationary launches in the Western launch market, but that number has now skyrocketed to nearly 60, an increase of over 560 percent.

Fortunately, American companies have created partnerships with Russia and Ukraine that promote American interests and should help push these countries along the path towards a free market economy, which is a crucial first step towards a fair and equitable launch market.

However, we must be vigilant in ensuring that all sides are living up to their end of the deal.

Another area that will be looked at today is spaceports. We currently have five commercial spaceports all across the country, all of which provide intriguing and innovative solutions to lowering launch costs.

In fact, three of those spaceports, Florida, California and Alaska, are less than 12 months away from commencing operation. But there's one catch. After several years, the Department of Transportation has yet to issue the regulations and licensing requirements for these spaceports to operate.

These inexcusable delays, which stretch across Republican and Democratic administrations alike, can do nothing but harm the business plan of these emerging spaceports.

The future of the launch industry is not all gloomy. There are exciting new programs being developed at NASA such as NASA's X-33 program. Given the continued strong support of Congress and the Administration, we should see some very real progress come out of the program.

The benefits prove to be immense and the new technologies emerging from the program could easily propel U.S. leadership well into the next century.

I hope to continue to see healthy participation in X-33 and other follow-on X vehicles.

Maintaining a strong research and develop program is critical to our future success.

The commercial sector must not ignore the very real need to sustain R&D nor the payoff of taking risks.

And finally we need to look at the role of the Department of Defense, most notably the Air Force and commercial space.

The Air Force has been a critical and reliable partner in commercial space since its inception, and that relationship must be continued.

However, we need to seriously look at the long term plans of the Air Force and decide how to ensure the ambitious commercial launch schedules that are possible in the next few years can be adequately supported.

I hope this hearing can give us a better understanding of the needs of our launching industry and in particular shed some light on what should be our national policy in this important area.

[The following charts were utilized by Mr. Weldon:]

NME Launch Agreement Enforcement

Satellite	Country	Percent Below Western Price
Sat 1	China	22 - 30%
Sat 2	China	23 - 28%
Sat 3	China	28 - 36%
Sat 4	China	26 - 35%
Sat 5	Russia	30 - 35%
Sat 6	China	No data provided
Sat 7	China	No data provided
Sat 8	China	No data provided
Sat 9	China	No data provided
Sat 10	Russia	No data provided

Source: United States Trade Representative

Commercial Space Launch Agreement Between the United States and China

Article II (B) (iv) "The PRC agrees that its providers of commercial launch services shall offer and conclude any contracts to provide commercial launch services . . . at prices, terms, and conditions which are on a par with those prices, terms, and conditions . . . offered by commercial launch services providers from market economy countries, including the United States."

Article IV (7) (b) "The PRC shall . . . provide comprehensive information to the U.S. regarding prices, terms, and conditions offered by PRC providers of commercial launch services for the launch of satellites."

Signed by Ambassador Mickey Kantor
March 13, 1995

SOURCE: Memorandum of Agreement Between the Government of the United States of America and the Government of the People's Republic of China Regarding International Trade in Commercial Launch Services

Charts used June 12, 1996 by Dave Weldon

Commercial Space Launch Agreement Between the United States and Russia

Article V (1)	"The contractual terms and conditions, including the price, of commercial space launch services offered or provided by Russian space launch service providers to international customers shall be comparable to the terms and conditions, including prices, for comparable commercial space launch services offered by commercial launch services providers from market economy countries, the United States."
Article VIII (b)	"Russia shall . . . provide comprehensive information to the United States regarding prices, terms, and conditions offered by Russian space launch service providers for the launch of satellites."

Signed by Vice President Al Gore
January 30, 1996

SOURCE: Agreement Between the Government of the United States of America and the Government of the Russian Federatioo

What is a Launch Agreement Violation?

Article II (B) (iv) (a) **in the Chinese agreement and** ***Article V (2)*** **in the Russian agreement clearly state that the price differential between a Chinese or Russian launch provider and a western launch provider must be 15 percent or less in order to be consistent with the terms of the agreement. Both of these provisions are intended to ensure "comparable" and "on par" pricing with the United States and Europe.**

Charts used June 12, 1996 by Dave Weldon

NME Launches That Comply with the Commercial Launch Agreements

NO DATA PROVIDED TO CONGRESS

Source: United States Trade Representative

Charts used June 12, 1996 by Dave Weldon

I'd like to now yield to the Ranking Minority Member, Mr. Hall, for an opening statement.

Mr. HALL. Thank you, Mr. Chairman.

I certainly agree with the statements that you've made and that the competitiveness in the international launch trade marketplace has long been a very important matter for this Committee, and I'm pleased that the Chairman has called this hearing.

It was about a year ago, I think, maybe a year and a half ago, that we held a meeting on the global trade in satellites and launch services.

I have a feeling that a number of the issues that were raised at that hearing are still of great concern to us today.

One message that I took away from that hearing in 1994 was that issues surrounding space launch policy are, one, very complex. It's easy to say that. There are no simple solutions.

We don't seem to find simple solutions in anything anymore. Fundamental reality though is that we have two important economic sectors, the U.S. satellite industry and the U.S. launch services. These sectors sometimes have conflicting interests.

The challenge that we face and will continue to face is how best to balance the needs and interests of these sectors in a way that maximizes the benefits to the American taxpayer and the American economy as a whole by preserving the important national capabilities that we have.

Successive administrations have seen launch trade agreements with the so-called non-market economies of Russia, the Ukraine and China, as an important means or way of maintaining that balance.

I believe that we're going to hear today from officials of the U.S. Trade Representative about how well the agreements are working and what have been the successes and what are the on-going challenges associated with these agreements.

Clearly, we have a bipartisan interest in fair and enforceable launch trade agreements. Of course, Congress cannot insert itself into the on-going launch vehicle procurement. Rather, we have to depend on the USTR, and I'm sure that American interests are protected.

And I'm sure that American interests are protected, and I'm both hopeful and confident that the USTR is up to that challenge.

Finally, I understand that we will hear from Administrator Goldin, and Under Secretary Davis about initiatives that the Federal Government has undertaken with industry to upgrade our domestic launch technology and to lower its costs.

I believe that we need an administrator that one, has the courage to undertake that and has the ability to make it happen, and I think Dan Goldin's that guy. I'm very high on Mr. Goldin. I've differed with him about certain things, and I've seen him, he doesn't want to be called a politician, but when you can be appointed by two successive presidents, one a Democrat and one a Republican, you know your way around the political arena also. And that's very necessary in the political arena of the world because we're doing battle in this Administration for this nation and for this industry.

So such government-industry cooperation has proved highly effective in aeronautics and I think we'd be interested in hearing about NASA's and DOD's plans.

Mr. Chairman, thank you. I yield back my time.

Mr. Dave WELDON. I thank the Ranking Member.

Without objection, the Chair asks unanimous consent to declare a recess when the House is voting.

Hearing no objection, so ordered.

I'd like to now ask the Full Committee Ranking Minority Member, Mr. Brown, if he has some comments he'd like to make before we introduce the witnesses.

Mr. BROWN. Thank you, Mr. Chairman, for your courtesy, in light of the fact that I'm not a member of this subcommittee.

I do have a brief opening statement, but let me first commend you for your exemplary posture in getting this Committee started right on time. Normally, when I get here five minutes after, it hasn't even fully collected itself.

May I also add a word or two of accolade for what Mr. Hall has said about the Administrator of NASA, with whom I've had the pleasure of attending the launch of the DCSA last week. That was a memorable experience.

And I should like to point out that he has done more, as an ambassador for the Space Program than any other administrator in the history of the program, in my view.

And I want to compliment him for that and for being very effective.

Let me just say that in looking at this problem of launch policy, I am going to be constrained, for many reasons, to also want to look at the problem of our overall global competitiveness in both the launch business and the satellite business.

And for the welfare of the country, I think we have to consider these two as related.

And collateral issues, we have both spaceports and a satellite industry in California, so we have to look to the health of both those potentially rapidly expanding sectors.

And with that, Mr. Chairman, I ask unanimous consent to put the rest of my statement in the record.

Mr. Dave WELDON. Without objection.

[The prepared statements of Mr. Brown and Ms. Jackson Lee follow:]

OPENING STATEMENT OF HON. GEORGE E. BROWN, JR.

JUNE 12, 1996

Good morning. In view of the number of witnesses, I will make my remarks brief. First, I want to commend the Chairman for calling this hearing. As he knows, this is a subject that has been the focus of numerous hearings by the Science Committee in recent years, and I think recent developments in the space launch arena have reinforced the appropriateness of this hearing.

As we all know, the satellite industry and the space launch industry are both important components of America's aerospace trade, and growing parts of our economy. However, there inevitably have been areas where the interests and needs of those two industries have been in conflict.

It thus is important that our trade policies and other Federal initiatives help to preserve and promote the health of both the nation's commercial satellite and commercial launch industries. It is not an easy task to strike an appropriate balance, and I look forward to the testimony of today's witnesses as we review these issues.

Thank you.

OPENING STATEMENT BY CONGRESSWOMAN JACKSON LEE

HEARING ON THE U.S. LAUNCH STRATEGY

JUNE 12, 1996

Mr. Chairman, its been a while since this committee visited the issue of the U.S. launch strategy and our launch agreements with foreign nations; the last time was September 1994 and quite a bit has changed since then. While these issues are not new to this committee or Congress, there are a number of fundamental issues that must be addressed, and hopefully this hearing will shed some light on the proper way to deal with them. These issues are complex and involve competing U.S. economic interests, however, I believe any future action or legislation should be nonprojectionist, fair and most of all keep this country competitive in both launch vehicles, services and satellites.

Keeping a healthy Launch industry in this country is certainly in the interest of this nation and this Congress and I think that belief has been reflected in our continued support for NASA's X-33, and DC-XA programs. In addition, I applaud and support Mr. Goldin's efforts to advance the state-of-the-art and decrease launch costs and increase the access to space that will bring about a new revolution in our society and economy. I applaud last week's successful test of the DC-XA, now named the Clipper Graham, and point to it as a prime example of this effort.

However, while we are doing this, the question is begged as to why Republican members will support these projects, yet disdain NASA's aeronautics research as "corporate welfare." If possible, I would like an explanation as to what the difference is, because it is not obvious to me since both support major U.S. technology sectors and industries and both still require lots of engineering and science research.

Mr. Dave WELDON. At this time, I would like to thank the witnesses from NASA, DOD, FAA, and USTR, industry and spaceports, for coming to testify before us today.

We would appreciate it if you would summarize your remarks and keep them to five minutes.

All of your written testimony will be included as part of the record.

The first panel consists of government witnesses, beginning with NASA Administrator Dan Goldin, followed by Mr. Robert Davis, the Deputy Under Secretary for Space for the Department of Defense, Mr. Frank Weaver, Associate Administrator for Commercial Space Transportation for the Federal Aviation Administration, and two witnesses from the U.S. Trade Representative, Mr. Don Eiss, Deputy Assistant U.S.T.R. for Industry and Labor, and Ms. Catherine Novelli, Deputy Assistant U.S.T.R. for Eastern/Central Europe and Eurasia.

With that, I'd like to begin with Mr. Goldin.

STATEMENT OF THE HONORABLE DANIEL S. GOLDIN, ADMINISTRATOR, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Mr. GOLDIN. Thank you, Mr. Chairman.

Members of the Committee, I want to thank you for holding this timely hearing. NASA shares your sense of urgency.

Up until the 1970s, U.S. launches were preeminent in the world. Now they carry only about 30 percent of the worldwide commercial launch market.

In our estimation, the biggest problem is cost. Access to orbit is more than ten times too much, and reliability needs significant improvement.

The high cost of access to orbit is eating up our commercial and national space budgets. It's using up money that should be going toward opening the space frontier for commercial and scientific endeavors and national defense.

In the last 25 years, the U.S. has developed no significant new launch vehicle or rocket engine. This is essential for a vital, commercial launch industry.

While we did nothing to develop new propulsion systems over the last 25 years, the rest of the world developed 29. This is an unacceptable condition.

A reusable launch system is the only reliable approach that has a chance to drop costs by one to two orders of magnitude and increase reliability by one to two orders of magnitude.

NASA can achieve this with industry through the reusable launch vehicle and advanced space transportation technology programs.

The primary objectives of these programs are to:

(1) mature the long-term technologies required for the next generation systems;

(2) demonstrate the capability to achieve reusability, low developmental and operational costs, high reliability in safety and rapid launch turnaround times; and

(3) to reduce technical risk to encourage private investment in commercial development and operation of next generation systems.

Our basic approach is this. A NASA/industry partnership to develop breakthrough and precompetitive technologies, a vibrant partnership with other Federal agencies, like the Department of Transportation and Commerce, the U.S. Trade Representative, and most importantly the Department of Defense.

Validation of technologies and ground testing and flight testing of experimental vehicles and components, our philosophy will be to design a little, build a little, test a little, and keep the costs down and do what we say we'll do.

To work with the DOD for seamless transition from the EELV program to the RLV program. We're changing the culture. We'll perform these tasks with small, efficient management teams with well-defined test programs and orientation towards results, not process.

I want to close by thanking you, Mr. Chairman, and the members of this Committee, for your keen interest and concern.

NASA and industry is tackling some dramatic technological challenges. What we're after is no mean fete. We're aiming at revitalizing U.S. launch capabilities and opening up the frontier of space.

Your insight and leadership will be critical to us at NASA, to industry, to the American people, and to the future.

Thank you.

[The prepared statement of Mr. Goldin follows:]

Statement of

Daniel S. Goldin
Administrator
National Aeronautics and Space Administration

before the

Subcommittee on Space and Aeronautics
Committee on Science
U.S. House of Representatives

Mr. Chairman and Members of the Committee:

Our Nation's space program is facing a serious and growing challenge as exorbitant launch costs consume our valuable resources and limit achievements in space science, exploration, and commercial development. It has been 25 years since the United States developed a major new launch vehicle or rocket engine. Serious consequences await this Nation if Government and industry do not bring their respective strengths to bear on geometrically advancing U.S. national launch capabilities over the next decade. Both Government and industry have important and changing roles in this vital effort, centered around the absolute necessity for investing now in the technology needed to safely reduce the cost of access to space beginning early in the next century.

I would like today to outline NASA's role in revitalizing national space launch capabilities and how we are working with industry in mutual efforts to rebuild America's global leadership in space launch.

The Consequences of High Launch Costs

Mr. Chairman, access to orbit today costs roughly $10,000 for each pound of payload. This enormous expense is at least ten times too much, and is choking off the scientific and commercial potential of our national space program.

Such high cost, for example, means tightly-rationed access to the unique properties of orbital space, reducing the abundant promise of scientific, environmental, and commercial applications which enrich our quality of life on Earth. High cost means fewer missions of deep-space exploration that project America's pioneering spirit and expand our knowledge of the Solar System; and it means profound questions go unanswered such as the existence of life on other celestial bodies. NASA hopes soon to be launching as many as 14

smaller science missions per year. But we cannot afford $20-25 million per launch, or up to $350 million annually just for small payload transportation alone.

High cost also cripples the nation's payload development community. Commercial suppliers from the communications and Earth remote sensing industries are telling us the cost to orbit must come down to $1,000 per pound to be competitive on the world market using U.S. launch vehicles. Moreover, payload production costs are dropping sharply without corresponding decreases in launch costs. For example, the smallest U.S. launchers today cost over $15 million--too much for university-built payloads costing only $1-4 million.

Finally, the high cost of U.S. space launch also means foreign competitors are gaining market share. U.S. launchers, preeminent up until the 1970's, now carry only about 30% of the worldwide commercial launch market. The Russians have superior technologies in certain aspects of propulsion. The Europeans have overtaken us in commercial space launch using more modern expendable launchers. The Japanese are moving up fast. For too long, we have acted as though orbital space was not an important international commercial marketplace. We must learn from these mistakes as we move forward.

To summarize, U.S. access to space is so expensive it is a growing obstacle to mission frequency, creativity, and risk-taking -- the very attributes necessary for pioneering a new frontier, both scientifically and commercially. This erodes the Nation's launch industry and balance of trade, costing us thousands of high-value jobs. Our national space launch capability should be a springboard for-- not a dead weight on-- the Nation's economic competitiveness and well being. This Nation must--and can-- achieve radical reductions in the cost of access to space, do it in years not decades, and do it without sacrificing safety and reliability. This is the challenge facing us as we enter the next century, but we must act now if we are to overcome it then!

The Need To Leapfrog Current Launch Systems

Achieving affordable launches will require cost reductions approaching an order of magnitude--e.g., $40 million for launches now costing $400 million. Such sharp reductions across all payload classes will not be simple or easy.

Such cost reductions cannot be achieved through modernization of our current expendable launch vehicle (ELV) fleet. The Delta-, Atlas-, and Titan-class ELV's are rooted in the technology of the 1950's and '60's. They were

developed originally as suborbital ballistic missiles and only later converted to space launch. Although the industry has invested over $1 billion in upgrades to meet Government and commercial requirements, technical limits are being reached. Infrastructure supporting these systems is costly to maintain, processing and manufacturing continue to be labor intensive, and the aerospace industry contraction is increasing the rate of obsolescence in sub-tier suppliers.

Yet, we remain heavily dependent on ELVs to orbit U.S. scientific, technology, military, intelligence, and commercial payloads. They are aging systems, with outmoded tooling and manufacturing, and we operate them on borrowed time.

Likewise, the Space Shuttle--as valuable and versatile as it is--costs about $3 billion per year, or about a quarter of NASA's budget. Our Shuttle team has done a superb job in reducing costs to current levels, and are finding additional reductions without sacrificing safety.

As a near-term remedy, the Department of Defense is leading a necessary effort aimed at upgrading the national ELV fleet, called the Evolved Expendable Launch Vehicle (EELV) program. At the same time, NASA is pursuing near-term upgrades to the Space Shuttle system and looking at ways to privatize the entire operation. In the private sector, several small commercial launchers are being developed, however, reliability has been a problem and costs, while lower, remain high. These are fitting near-term measures, but, the intrinsic configurations and support requirements of these systems limit achievable cost reductions and performance gains to moderate levels. Although such evolutionary gains are crucial as a bridge to the ultimate improvements needed, they are in themselves not enough for the space launch requirements of the 21st century.

Revitalizing U.S. Launch Capabilities--
The Reusable Launch Vehicle Technology Program

NASA's primary space launch role is to develop and demonstrate pre-competitive next-generation technology that will enable the commercial launch industry to provide truly affordable and reliable access to space. This in turn should enable the U.S. to recapture leadership in worldwide commercial space transportation in the early decades of the next century.

Accordingly, NASA and major U.S. aerospace companies have embarked on an urgent and unprecedented partnership aimed at attaining radical improvements in launch system cost and performance. This is the goal of NASA's Reusable Launch Vehicle (RLV) technology program and the Advanced Space Transportation (AST) technology program.

NASA's RLV program consists of several phases: systems engineering and concept analysis, ground-based technology development, and a series of flight demonstrators--the DC-XA, the X-34 small demonstrator, the X-33 advanced technology demonstrator, and perhaps other future experimental vehicles depending on the technology needs or opportunities that emerge. All vehicles will be suborbital, but together will be aimed at advancing the state of the art in launch technology to substantially reduce the risk associated with developing a full-scale operational RLV.

To optimize the respective strengths of Government and industry, NASA is using an innovative management strategy centered on industry-led cooperative agreements. Government participants such as NASA's space and research centers are acting as partners and subcontractors, performing tasks chosen by the industry leaders and utilizing the specialized expertise and facilities of the Government.

As directed by the President's National Space Transportation Policy and subject to decision criteria agreed to with OSTP and OMB, the RLV program will face two major Government and industry decision points--the first in just a few weeks and the other around the end of the decade. The first decision will relate to whether the underlying technologies are sufficiently advanced to proceed with building the X-33 flight demonstrator. Approval is not a foregone conclusion, although we are determined to meet this challenge.

An extensive, independent study has just been completed by a panel of the National Research Council's Aeronautics and Space Engineering Board (ASEB) validating our development, test, and analysis programs in reaching this important milestone. Also, the NASA Advisory Committee, tasked with an independent verification of the criteria, has determined that the criteria have been met and recommended that we proceed with development of the X-33.

The second decision will be made after X-33 ground and flight tests, when Government and industry will consider whether full-scale development of an operational RLV should be pursued. At that point, if industry and the capital investment community are not satisfied that the technological risk is low enough to proceed to full-scale development, we in NASA will press on with RLV technology work to do what needs to be done. For example, the X-33 may require further testing, or a follow-on vehicle to the X-33 may be needed to prove ultimate feasibility.

Breakthrough Goals of the RLV Technology Program

NASA is well on its way to demonstrating the viability of a reusable launch vehicle. Briefly, there are six RLV parameters to be demonstrated:

- **Reusability** ensures that engines, structures, tankage, and other components do not require frequent, costly, and time-consuming change-out, disassembly, inspection, and refurbishment. This implies well-tested margins on such factors as temperatures, pressures, seals, joints, and spin rates.

- **Operability** means not waiting for months between flights; launches will be possible in a matter of hours or days, using health monitoring systems that will indicate which components need attention and which do not. Maintenance will be modularized for easy servicing. Ground crews will be numbered in the dozens rather than thousands. Launch and landing parameters will not be as sensitive to weather constraints like wind velocity and precipitation.

- **Reliability** requires deep knowledge of all systems and their limits in all regimes of operation. For example, advanced components such as graphite composites require new ways of testing and health monitoring that are very different from conventional aluminum structures. Advanced health monitoring systems will provide unprecedented structural and propulsion status information. Our goal is .999 reliability rather than the current .95 that insurance companies use to establish coverage costs for commercial vehicles.

- **Safety during abort** of launch and all phases of mission is an RLV requirement, including the capability to return to original launch site. Transatlantic abort sites will no longer be needed, saving operational costs and manpower. Safety is paramount and will be addressed in all phases of design, development, and operations.

- **Mass fraction** means the launch weight of the vehicle must be composed of 90% or more propellant without sacrificing reusability, operability, and reliability. This is technically challenging, but improved mass fraction is critical for achieving our goal of $1,000 per pound of payload.

- **Affordability** is a function of each parameter above, measured by cost. Reusable composite tanks are expected to be more affordable than jettisoned aluminum tanks over the life of the vehicle. Fast turnaround flights made possible by designed-in low-maintenance requirements translate to lower costs. High reliability, to be established during the flight demonstration phase, can substantially lower insurance costs, and thus the

per-flight cost of each vehicle and payload. Eventually, at 1-2 flights per week, huge savings can result that also translate into increased U.S. global competitiveness.

The RLV's Enabling Technology

The RLV technology program is now in the early stages of ground and flight demonstrations aimed at progressively establishing the necessary technology verifications that will enable commitment to the RLV's revolutionary new space launch system early in the next century.

NASA is confident that the RLV program will succeed even though the National Launch System (NLS), National AeroSpace Plane (NASP), and other past attempts failed. One reason is that our approach is not solely Government-directed; the program benefits proactively from the close-in, creative know-how of our aerospace partners. And, we are not attempting too much too soon, such as NLS- and NASP-type flight regimes ranging from zero to Mach 25 in early test vehicles. Revolutionary technology must be developed incrementally. At the same time, we are building on a variety of technologies salvaged from these past efforts, as well as from development of high-performance military aircraft, the Space Shuttle, the New Millennium spacecraft program, and even commercial airline research.

NASA's RLV technology program's approach is to "design a little, build a little, test a little, fly a little"-- in a phased, logical progression all the way through ground tests and demonstration flights on the DC-XA, X-34, X-33 and beyond.

The DC-XA. New technologies are already undergoing flight demonstrations on the advanced version of the DC-X, called the DC-XA. For example, the DC-XA is flight testing the first-ever large-scale composite hydrogen tank, a new lightweight aluminum-lithium oxygen tank, and composite fuel lines, joints, and valves. The vehicle is now at White Sands Missile Range where three flights were recently and successfully completed. The third flight followed the second flight the very next day.

The X-34 Small Reusable Demonstrator. The X-34 vehicle will demonstrate technologies necessary for a reusable vehicle, but will not be a commercially viable vehicle itself. This allows the X-34 vehicle to be more effectively designed as a flight demonstrator test bed and to close the performance gap between the subsonic DC-XA flying in the spring of 1996 and the 15,000-17,000 ft/sec X-33 flying in the spring of 1999. This has been, and remains, NASA's top priority objective for the X-34.

It should be explained that the initial X-34 effort combined NASA's need for

early technology demonstration with industry's need for a commercially viable small launcher. Unfortunately, our industry partners determined that the current economic viability of the program could not justify their investment and they withdrew. However, NASA's objectives for the X-34 to be a technology demonstrator and pathfinder for X-33 remain unchanged.

After completion of its first flight series, the X-34 vehicle could be modified to demonstrate the more advanced technologies coming out of the Advanced Space Transportation Technology program (see below). This modified X-34 would benefit from being comparatively small, thereby lowering the expense and risk of demonstrating the technologies, and making their integration into the vehicle less costly. A low-cost X-34 demonstrator can increase the scope and aggressiveness of flight demonstrations, thus increasing the return to the RLV program.

The X-33 Advanced Demonstrator. Building on ground-based testing as well as the DC-XA and X-34 flight tests, the X-33 program is aimed at integrating and testing advanced component technologies necessary to move to a full-scale RLV.

The X-33 advanced demonstrator will bring these technologies together for the first time in a proof-of-concept demonstration of the feasibility of a single-stage-to-orbit (SSTO) launch system. The SSTO approach offers the greatest potential savings and performance of any configuration, as measured by the parameters of reusability, operability, reliability, affordability, safety, and mass fraction. By striving for SSTO, NASA is pushing the technology envelope to the maximum in order to maximize the potential benefits of the technology development program. However, should SSTO prove infeasible, the great majority of research will be applicable to lower-performing multi-staged vehicles.

Technologies to be integrated and demonstrated by the X-33 program include:

- Lighter, reusable cryogenic tanks;

- Application of New Millennium micro electronics (Avionics on a Chip) to the RLV for vastly improved reliability and vehicle health management;

- Advanced Thermal Protection Systems to achieve lighter weight, durability, and low-cost maintenance;

- Ground and flight operations techniques that will substantially reduce turn-around time and other operations costs for the RLV; and

- Propulsion to reduce the development risk for the RLV engine and prove

the necessary operability;

The fast-track development of the X-33 vehicle precludes flying the engine that will be used on the operational RLV. For this reason, in parallel with the X-33 program, development and ground testing of orbital insertion engines will proceed that will enable the level of reusability, operability, and thrust-to-weight requirements necessary for a full-scale RLV.

Beyond The RLV's Technology Goals-- The Advanced Space Transportation Technology Program

Continuing the revolutionary advancements in space access that we expect from the RLV Technology Program, the Advanced Space Transportation (AST) technology program will focus on a broader spectrum of technological advances with the potential to reduce costs well beyond RLV goals. It aims at a cost to orbit measured in hundreds not thousands of dollars per pound. The AST program has been structured in three key elements; (1) advanced reusable propulsion technology, (2) small payload launch technology, (3) and advanced space transfer technology. Each element will address a recognized need for near- and long-term reductions in space launch costs. Funding for AST is planned for FY 1996-97 with outyear budget levels to be developed .

The first element, advanced reusable propulsion technology, will focus on significantly increasing rocket propulsion performance margins to allow for longer life and reduced maintenance over planned RLV systems. Revolutionary propulsion systems, such as rocket-based-combined-cycle or combined air breathing and rocket propulsion designs, augment rocket systems with air to significantly enhance overall system performance, reduce vehicle size, and improve operational margins. This technology holds the promise of airline-like operations but is higher risk than those being considered for the X-33 and require further significant technological advancement.

A near-term focus of this activity is development and ground test of critical combined cycle components by 1997. Possible follow-on phases will concentrate on component and integrated systems development and demonstration necessary to reduce the risk associated with combined cycle rocket-based propulsion. A system flight demonstration is being studied for the turn of the century. Even if these systems do not mature in time for inclusion in an initial operational RLV, investment in this area is crucial for the longer-term future of space transportation.

The second AST program element, small payload launch technology, focuses on a segment of NASA's launch requirements not addressed by the RLV program. This element focuses pre-competitive technology activities on

dramatically reducing the cost of launching payloads of 500 pounds or less. This technology will enable the eventual commercial development of small payload launch vehicles and will utilize non-traditional suppliers, commercially available parts and commonality among components to realize production rate cost advantages.

Investments will also be made in innovative design for low-cost manufacturing and systems engineering which will lead to space transportation hardware that does not require the highly specialized, labor intensive manufacturing and operation of current space transportation systems. For example, current cost estimates for a small launcher liquid oxygen/kerosene propulsion system are $3-4 million. This AST element will demonstrate technologies aimed at engine systems costing $300-400 thousand and will begin ground testing of priority technologies by the end of 1997.

The third AST element, advanced space transfer technology, is aimed at increasing the efficiency and reducing the cost and trip time of current orbital transfer systems. Transfer systems which increase transportation efficiency by more than a factor of two seem achievable within five years. Payloads requiring delivery to geosynchronous equatorial orbit could be launched by smaller, lower cost launch systems or share space with other payloads on larger launch systems. Reduced trip times will shorten the time that teams will be required to remain in place to execute missions. Exploration initiatives like the New Millennium Program are focused on miniaturizing spacecraft, but cost advantages will be weakened unless spacecraft propulsion reaches efficiencies which allow an order of magnitude reduction in size and mass. The near-term focus of this effort is a solar thermal propulsion demonstration in orbit by 1998, and an electric propulsion application on the initial flight of the New Millennium spacecraft.

Commercial Launch Strategy -- A Paradigm Shift in Progress

During Apollo, the government and industry worked together in a partnership that moved this nation forward to historic accomplishments in space with untold benefits on Earth. We are rediscovering the spirit of Apollo -- that a government and industry team working together is the right stuff, and advanced technology will have nearly immediate potential for terrestrial applications. We are using innovative methods-- from the shop bench, to procurements, to policy changes-- in order to prove the viability of this approach. We are encouraged by the results so far.

At the same time, we are concerned over the apparent lack of commitment of many industry leaders to invest in advanced technologies needed for long-

term success. Past technology efforts have been focused on short-term needs and have lacked the vision and investment needed to help maintain our nation's leadership in space launch.

Changing Roles of Government and Industry. The space launch industry must realize that the days of large NASA contracts to develop, build, and operate launch systems are over. NASA is becoming a customer not a manager or dominator of the launch industry -- a relationship which in the past contributed to noncreative dependency by the industry on the Government. NASA now buys and will continue to buy launch services. And NASA has the responsibility to be a smart buyer.

This means both the burden and the opportunity of developing successful and profitable operational vehicles and systems is shifted to the aerospace industry. Companies with vision who demonstrate creative technological excellence at low cost and risk will beat their competition and will win NASA's launch business in all payload classes.

At the same time, NASA's role will continue to be development of pre-competitive technologies to radically reduce space launch costs, working closely with industry to optimize development funding and respective strengths. This includes joining forces with companies through cost-shared cooperative agreements to focus and maximize results. NASA's RLV technology program is based on this approach, and is driving leapfrog component technologies toward readiness for pre-2000 flight demonstrations and post-2000 commercialization.

Real commercialization of the space launch industry depends on NASA and industry working closely on pre-competitive technologies, and industry picking up and running with development of the operational launch systems. This paradigm shift will, we believe, become the future norm for most of the U.S. Government's space launch business during the operational RLV era. This shift in Government-industry relationships will also position the commercial launch industry to regain preeminence in the global marketplace since it incentivizes companies to develop, build, and launch vehicles that will outstrip foreign competition.

Foreign Involvement. At the same time, the space launch business--like business everywhere--is becoming more internationalized. U.S. and foreign launch companies are increasingly seeking to maximize their competitive position by taking advantage of respective strengths and joining forces for gaining market share.

Such arrangements are acceptable so long as no taxpayer dollars go to foreign companies for launch technology development that in turn could be used to

strengthen foreign competitive launch systems. And provided that no U.S. technology is unlawfully transferred out of the country.

Investment By NASA and By Industry. NASA is prepared to pay for the technology work necessary to reduce the risk, with some "earnest money" cost sharing from our corporate partners. The point when we are looking for serious industry investment is after the risk is reduced to an acceptable level, when a customer base--the U.S. Government among them-- can be formed, and private sector capital can finance development, production, and operation of a commercial RLV fleet.

NASA and other space-faring agencies of the Government will be major, continuing customers of successful RLV operators. This business will enable economies of scale and product volume that will permit attractive deals with U.S. domestic and global launch users. This expanded market will enable further economies and margin growth.

Yet, despite the potential future market, NASA is being told by the space industry that some form of Government amortization of commercial development costs, or Government-guaranteed manifesting, tax holiday, or other financial incentive device, is required before venture capital can be raised for full-scale commercial development of the RLV fleet. NASA is examining the need for some type of incentive in this area and looking at feasible options should they prove necessary for full-scale development of the RLV fleet.

Just as NASA has a responsibility to be a smart buyer, we welcome the smart, responsible corporate vendor of launch services. Costs will be radically lower and performance superior in terms of lift, scheduling, quality, and safety. Everyone benefits and well-deserved profits will flow. But the corporate operators/vendors must realize that they are accountable for any lack of performance. The Government must not be expected to cover all risks. Under-capitalized operations, uncertified vehicles, and reliance on "Government-support-no-matter-what" are formulas for failure. And, **the Government, the launch industry, and the overall U.S. space program cannot afford to fail in this endeavor to make access to space affordable.**

A National Team Effort To Effect Change

It is never easy to effect significant change. But we must. The stakes are enormously high: they are no less than the future viability of the nation's space program, enabled by a vigorous, world-class U.S. space launch capability. Radical improvements in performance and cost will directly benefit our national defense, our science and technology for civil space, and

open a new era of commercial development of space. If this nation is to remain a preeminent leader in exploring and utilizing the unique frontiers of space, we must make the changes needed now to achieve the results required in just a few years.

NASA fully accepts its leadership responsibilities in this area, but also realizes the complexities involved. It will take the help and cooperation of many agencies and the private sector to achieve our RLV goals.

Revitalizing U.S. space launch capabilities will require the best from all of us: the best of NASA's expertise and facilities, the coordinated utilization of special expertise and facilities of other space-faring agencies such as the Department of Defense, close interaction with other Federal agencies such as the Departments of Transportation and Commerce and the Office of the U.S. Trade Representative, the best creative genius and entrepreneurial energies of the commercial launch industry, and--not least--the best guidance and support the Congress can provide. The decisions we make collectively and individually will impact the viability of the space program and future American leadership throughout the world.

Thank you, Mr. Chairman, for the support of this Committee. We are ready to work with you in every way to advance this vital national effort.

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Mr. Dave WELDON. Thank you, Mr. Goldin.
Mr. Davis?

STATEMENT OF MR. ROBERT DAVIS, DEPUTY UNDER SECRETARY FOR SPACE, U.S. DEPARTMENT OF DEFENSE

Mr. DAVIS. Thank you, Mr. Chairman.

I'm pleased to address Department of Defense support for the U.S. commercial space sector. I'm especially happy to have this opportunity to present a real success story, one the Congress and the Department of Defense working together created within the existing framework of supportive policy and law.

For over a decade now, the Commercial Space Launch Act and national policy have provided a consistent framework for DOD support to U.S. commercial space activities. In fact, this consistent direction has spanned the Reagan, Bush, and Clinton Administrations. Under this framework, key Department of Defense responsibilities include:

Stimulating private investment, ownership, and operation of space assets;

Providing stable and predictable access to government hardware and facilities on a reimbursable basis; and

Involving the commercial sector in design, development, and financing of space transportation capabilities.

Starting in fiscal year 1995 and continuing for the rest of the decade, U.S. commercial launches will be a much more significant fraction of U.S. expendable launch totals.

For example, in both fiscal years 1995 and 1996, commercial launches from Cape Canaveral Air Station outnumber DOD and NASA expendable launch vehicles combined. The same will be true at Vandenberg Air Force Base in fiscal year 1997.

U.S. commercial space launch activity did not actually begin in earnest until the Air Force awarded critical Atlas and Delta launch contracts after the Challenger accident and commercial launch providers could use the Air Force business base to build, process, and launch commercial vehicles at marginal cost.

Since 1989, we have been providing extensive support for U.S. commercial launch operators at both Cape Canaveral Air Station and Vandenberg Air Force Base, all on a marginal cost basis, as directed by national policy and law. That is, we only charge commercial users what it costs us to provide their incremental support.

DOD stands prepared to continue, within certain constraints, to expand our supporting relationship with U.S. commercial launch service providers. The major constraining variables are the potential to adversely impact national security launch capabilities, and the no-longer insignificant financial impact of charging commercial users only the incremental costs as commercial launches become the majority of launches from Air Force launch facilities.

DOD has a long and successful history of supporting commercial space launch activities. We played a pivotal role in enabling the U.S. commercial launch industry to get started.

We are proud of the DOD space launch infrastructure that has been so essential to enabling the U.S. commercial space launch industry to compete successfully in the world market.

We are making substantial investments for the future to further improve the competitiveness of the U.S. commercial space launch industry, including $750 million for Range Standardization and Automation, and $2 billion for development of a family of new expendable launch vehicles.

DOD facilitated the development of commercial spaceports through the Congressionally initiated Space Launch Infrastructure Grant Program.

The commercial spaceport projects currently underway on DOD installations are focused exclusively on small expendable launch vehicles.

In the near term, they neither aim to, nor will they be capable of supporting more than research and development missions for DOD, and we are actively pursuing options for them to participate in that area.

To ensure a consistent and coherent approach, DOD is actively co-chairing an interagency effort to address all aspects of Federal Government interaction with spaceports to encourage their success and the continued success of the U.S. commercial space launch industry.

Once again, I would like to thank the Committee for this opportunity to recount the success story of DOD support to U.S. commercial space launch activities and to highlight our plans for continuing our stewardship of America's access to space.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Davis follows:]

Statement of

The Deputy Under Secretary of Defense for Space

Robert V. Davis

Before

the

Subcommittee on Space and Aeronautics

of the

House Committee on Science

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Introduction

I am pleased that you have invited me to appear before you to address Department of Defense support to the U.S. commercial space sector. I am especially happy to have this opportunity to present a real success story--one the Department of Defense helped to create within the framework of supportive policy and law. The topics I will discuss today hold the promise of brightening the future international competitiveness of our commercial space launch industry and contributing to the national interest and economic well-being of the United States. Commercial space transportation, including the establishment and operation of launch sites and associated supporting infrastructure, is an important element of the space transportation capability of the United States. Through time, the Department of Defense, particularly the Air Force, has acted as an excellent steward maintaining America's ability to access space--not just for national security missions, but for civil and commercial activities as well. What I would like to do today is briefly tell you about the department's demonstrated and continuing commitment to provide unsurpassed support to evolving U.S. commercial space launch activities.

Overview of DoD Support for Commercial Space Launch Activities

For over a decade now, the Commercial Space Launch Act and National Policy have provided a consistent framework for DoD support to U.S. commercial space activities. In fact, this consistent direction has spanned the Reagan, Bush, and Clinton Administrations. Under this framework, key Department of Defense responsibilities include:

---- Stimulating private investment, ownership, and operation of space assets by providing stable and predictable access to government hardware and facilities on a reimbursable basis, and

---- Involving the commercial sector in design, development, and financing of space transportation capabilities.

We have institutionalized and, through time, improved the key implementation mechanisms used within the Department of Defense to carry out these responsibilities. For instance, last year we completed updating DoD instructions that explain how we support commercial space activities. Later this summer, we plan to incorporate in these instructions the guidelines for federal government interaction with spaceports, which are currently being developed by an interagency government team. I'll talk more about that later. Also in the past year, we finalized our "Policy on Use of Air Force Real Property for Commercial Space Activities" which addresses critical competition issues associated with increasing commercial use of government launch property. This new policy also defines processes for use of a newly updated standard range use agreement, which will include a standard lease or real property license for non-exclusive use of launch property.

I think a brief look at recent and projected launch rate trends may serve to illustrate how successfully we have carried out our responsibility to support commercial space launch activities. Traditionally, DoD and NASA expendable launches have significantly outnumbered U.S. commercial launches. However, starting in Fiscal Year (FY) 1995 and continuing for the rest of the decade, U.S. commercial launches will be a much more significant fraction of U.S.

expendable launch totals. For instance, in both FY 1995 and 1996, commercial launches from Cape Canaveral Air Station outnumber DoD and NASA expendable launches combined. The same will be true at Vandenberg Air Force Base in FY 1997. In addition, commercial launches required over the next five to ten years to deploy and sustain new commercial satellite constellations providing worldwide messaging, voice and data communications, and remote sensing, could also lead to commercial launches continuing to outnumber DoD and NASA expendable launches into the next century.

This growth in U.S. commercial launch rates would not have been possible without the past and continuing excellence of DoD stewardship of U.S. commercial space launch support. Indeed, as I'm sure you're aware, U.S. commercial space launch activity did not actually begin in earnest until the Air Force awarded critical Atlas and Delta launch contracts after the Challenger accident and commercial launch providers could use the Air Force business base to build, process, and launch commercial vehicles at marginal cost. Since 1989, we have been providing extensive support for U.S. commercial launch operators at both Cape Canaveral Air Station and Vandenberg Air Force Base, all on a marginal cost basis, as directed by National Policy and law. That is, we only charge commercial users what it costs us to provide support. Examples of our stewardship include:

---- Operations & Maintenance: We spend $30 million per year for O&M activities on the government Atlas and Delta programs, most of which also benefits commercial activities using the same processing facilities and launch pads.

---- Evolved Expendable Launch Vehicle (EELV) Development: We plan to spend $2 billion over ten years for the express purpose of reducing the cost of U.S. access to space--something that will certainly have major implications for U.S. commercial competitiveness.

---- Facilities: U.S. commercial space operators use over $1 billion worth of DoD launch pads, processing facilities, control centers, and associated launch infrastructure--all at marginal cost, without amortizing any of the development costs.

---- Ranges: DoD supports every U.S. commercial space launch using worldwide range assets that cost us nearly $240 million per year to operate and maintain. We are also investing $750 million over 10 years to improve range turn-around time and robustness--improvements that will be key to supporting even more commercial launches in the future.

---- Services: The Air Force alone employs 5,300 people to provide weather, power, security, safety, communications, civil engineering, and other support functions at our two space launch bases for national security, civil, and commercial missions.

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Integrating Commercial Requirements into EELV

The Evolved Expendable Launch Vehicle or EELV program is aimed at reducing the costs associated with the Department of Defense portion of the National Mission Model. It will also provide a more competitive commercial launch capability for the U.S. The EELV program is actively involved in addressing the commercial industry's interface requirements for both the vehicle and the range.

The EELV program has established a Payload Interface Working Group (PIWG) and a Standard Interface Working Group (SIWG) to address the development of the interfaces required by the launch vehicle. These working groups have active participation from our commercial satellite industry as well as government agencies. The commercial satellite industry can, through the EELV program, provide interface requirements that are considered in the development of the launch system. The EELV program has also established a Range Working Group (RWG) that is addressing the interface requirements between the launch vehicle and the ranges that will be used to support space launch activities. This will allow for an overall increased efficiency for both the launch vehicle and the range which will directly benefit commercial launch providers since the same range facilities and capabilities are utilized for both government and commercial launch.

Another effort that is currently underway to address commercial launch requirements is the National Spacelift Requirements Process (NSRP). This process has been established to gain and sustain a consensus among civil, commercial, defense and intelligence space sectors on common spacelift system requirements. Through the implementation of this process, a National

Spacelift Requirements Document will be developed that will contain the top-level system requirements. These requirements will be utilized in the development or modification of any national launch system capability. The NSRD will be reviewed on an annual basis by a National Spacelift Requirements Council that is composed of representatives from the DoD, Department of Commerce, the FAA's Office of Commercial Space Transportation, and NASA.

Spaceports as Part of U.S. Commercial Space Sector

With that explanation of our past, current, and future commitment to support U.S. commercial space activities, I'd like now to turn to the relatively new element of the U.S. commercial space sector I alluded to earlier, namely spaceports. Once again, as with the commercial launch business, DoD, and especially the Air Force, played a pivotal role in bringing this element of the commercial space sector to life. The current crop of state spaceports probably would not be under construction today if it had not been for the initial up-front investment in FY 1993 and 1994 provided by the Air Force Dual Use Space Launch Infrastructure Grant Program. The purpose of the grant program was to jump-start infrastructure development projects to benefit the government and commercial space sectors by providing federal grant funds to match industry contributions at a ratio of three to one respectively. Spaceport construction projects competed very successfully both years, receiving two-thirds and three-fourths of the $10 million available in FY 1993 and 1994 respectively. The remainder of the grant funds went to specific industry projects and some studies.

Several spaceport projects are underway today as a result of the grant program, including projects to support a variety of new small launch vehicles in:

---- California: Where work has been completed to refurbish a mothballed Space Shuttle facility at Vandenberg Air Force Base for satellite processing. In addition, privately financed launch pads have been under construction since 1995, with a planned first launch in 1997.

--- Florida: Where construction is underway to modify an active Navy Trident launch pad at Cape Canaveral Air Station to support a first launch in late 1996.

--- Alaska: Where a state agency is seeking environmental approval for their plans to build new launch facilities on Kodiak Island.

--- And in New Mexico, business plans and environmental analysis is underway to assess developing a spaceport for Reusable Launch Vehicles adjacent to the Army's White Sands Missile Range.

DoD Interaction with Spaceports

As part of the dual-use nature of the grant program that led to the development of these spaceports, we in DoD see some potential for commercially operated launch sites to benefit government launch programs in particular instances, especially in the small payload category. To begin examining this potential on a small scale, the Air Force recently awarded call-up

contracts to spaceport organizations in California, Florida, Alaska, and Virginia to support possible government space launches of converted Minuteman II missiles. No launches have been called-up yet, but the Secretary of Defense has approved a demonstration flight to prove the concept of conversion and to obtain empirical data on the cost of conversions. Any use of the Minuteman II for government payloads would be subject to the criteria outlined in the President's policy.

While we are examining the potential for spaceports to provide a lower cost alternative for small government launches compared to building dedicated infrastructure, we are also actively providing various types of launch base support for spaceports on DoD installations around the country. As I mentioned earlier, we have a standard agreement structure in place to ensure we provide use of government property and services to all elements of the U.S. commercial space sector under the same general terms and conditions. We have such agreements in place with the spaceport organizations operating on our launch bases, allowing them access to both Air Force and Navy facilities and various support services.

Diversity Among Spaceports

While the spaceport projects may sound like they have similar goals, the current group of spaceport organizations is characterized more by diversity than by similarity. For instance, a state government agency functions as the spaceport authority in Florida, a non-profit corporation fills the role in Alaska, a University is designated as the spaceport authority in Virginia, and

California's spaceport activities are carried out by a for-profit joint venture consisting of an arm of the state-designated non-profit spaceport authority and a major U.S. company.

Diversity among spaceports extends into the types of projects they intend to pursue, their concepts of operations (which have shown a tendency to change dramatically over time), their positions regarding virtually every aspect of interaction with federal government agencies, their responsibilities while operating on federal installations relative to their launch customers', and their authority (and even desire) to regulate commercial space activities in their respective states. Because of this exceptional diversity, the federal government is faced with a complex task in formulating an inclusive definition for the term "spaceport;" we are faced with an exceptionally complex task in attempting to formulate fair and uniform guidelines for interacting with them.

Developing Federal Guidelines for Interaction with Spaceports

With this diverse case of spaceport players doing construction work and planning launches in the next year or so, the time is right to finalize some broad federal guidelines to define the most important aspects of federal government interaction with them. DoD has been working to address this need formally since last fall. In early March, we formed an Interagency Integrated Product Team, co-chaired by my principal assistant, Mr Gil Klinger, and the FAA Associate Administrator for Commercial Space Transportation, Mr Frank Weaver. The interagency working group includes representatives from the Army, Navy, Air Force, Joint Staff, U.S. Space Command, the FAA, NASA, and the Departments of Commerce and State. The

Interagency Working Group (IWG) is structured to report its findings and recommendations to the OSTP and the NSC for review and approval.

The working group's approach is to execute a four step process, beginning with activities to define the scope of topics and issues to be addressed in the federal guidelines. The objective is to address all aspects of federal interaction with spaceports. The working group has already had several interagency government meetings, and solicited inputs from the commercial space sector to be sure we understand the full scope of topics and issues of interest to the various involved agencies of the federal government, to the spaceport organizations themselves, and to their prospective customers--and even their competitors--in the U.S. commercial launch industry. In April, the working group held sessions to gather inputs from organizations planning to build and operate commercial launch sites in Florida, California, Alaska, Virginia, and New Mexico. In the past few weeks, the working group also met with several commercial space industry representatives, including Lockheed Martin, Orbital Sciences, Astrotech, and Boeing. As a result of this scoping process, the list of key topics includes:

---- A definition for the term "spaceport."

---- Allocation of risk and financial responsibility.

---- The respective roles of various federal government agencies in establishing safety and environmental requirements and overseeing spaceport operations to verify compliance.

---- International involvement at spaceports on and off federal government installations.

The next step, which is currently underway, is for the working group to develop and assess options for each issue to be addressed in the guidelines. We will be working in the next few weeks to build consensus recommendations within the working group to address each issue. We hope to get each agency to agree to these positions by the end of the month.

The third step, which we hope to have well underway by the end of the month, is to formally coordinate the draft guidelines among the involved federal government agencies and OSTP. We are working on a schedule to complete the coordination process during the summer.

The fourth step will be to transmit the IWG's findings to the OSTP and the NSC for review and approval.

Once the federal guidelines are in place, each involved federal government agency will be in a position to use them as the basis for developing consistent implementation documents for execution. The guidelines will also serve as the coordinated basis for seeking additions to National Policy or law, if any are required.

Bottom Line

I'd like to sum up my comments today with a few observations. DoD has a long and successful history supporting commercial space launch activities at our active launch bases. We played a pivotal role in enabling the U.S. commercial launch industry to get started. We are proud of the stewardship we have provided for the U.S. space launch infrastructure that has been so essential to enabling the U.S. commercial space launch industry to compete successfully in the

world market. We are making substantial investments for the future to further improve the competitiveness of the U.S. commercial space launch industry--including $750 million for Range Standardization and Automation and $2 billion for EELV. Enabled by our successful stewardship, we recognize that U.S. commercial space activities are likely to expand in the near future, and we are approaching a time when U.S. commercial expendable launches consistently outnumber DoD and NASA expendable launches.

Contributing to another aspect of this expansion, DoD initially enabled the development of commercial spaceports through the Space Launch Infrastructure Grant Program. The commercial spaceport projects currently underway on DoD installations are focused exclusively on small expendable launch vehicles. They neither aim to, nor will they be capable of supporting more than research and development missions for DoD--and we are actively pursuing options for them to participate in that area. To ensure a consistent and coherent approach, DoD is actively co-chairing an interagency effort to address all aspects of federal government interaction with spaceports to facilitate and encourage their success and the continued success of the U.S. commercial space launch industry.

Closing

Once again, I would like to thank the Committee for this opportunity to recount the success story of DoD support to U.S. commercial space launch activities, and to highlight our plans for continuing our stewardship of America's access to space.

Mr. Dave WELDON. Thank you, Mr. Davis.
Mr. Weaver?

STATEMENT OF MR. FRANK WEAVER, ASSOCIATE ADMINISTRATOR FOR COMMERCIAL SPACE TRANSPORTATION, FEDERAL AVIATION ADMINISTRATION

Mr. WEAVER. Good morning.

I'm pleased to be here on behalf of FAA Administrator David Hinson, and on his behalf I would like to express his full support of the FAA in support of working with other government agencies, you and the industry in making sure we have a very robust commercial space transportation industry.

I would like to submit my written testimony for the record, with your permission, and just spend a few minutes talking to you about space transportation safety and international competitiveness, and how our office, the Office of Commercial Space Transportation within FAA, works to achieve these ends.

It appears that development and use of satellite based technologies is far from tapped, and this means that commercial space launches will continue to grow in number as well as to evolve in character over time.

What the United States must be mindful of is the need to ensure that the commercial space transportation industry grows safely as it assumes even greater prominence in the international market.

We at FAA, in cooperation with key government and industry players, must plan for the future growth of commercial space transportation by the development of spaceports and new launch systems like the reusable launch vehicle.

Most FAA activity I will describe falls into five key areas: licensing, regulations, space systems development, space policy, and customer service.

Let me take just a few minutes to tell you about FAA efforts to address these areas.

The FAA fully expects to see license applications for commercial launch sites, or they're also known as spaceports, in the very near future. Five states, including your State of Florida, have efforts along these lines underway with others having expressed interest.

The FAA has had discussions with many of these states at various stages, and eagerly awaits the first formal submission of a spaceport or a commercial launch site license application.

As you know, we're also working with the Florida Spaceport Authority which is in the process of converting an unused launch pad at Cape Canaveral for the commercial use of several smaller launch vehicles.

And California Spaceport Systems International is developing similar capability and Vandenberg Air Force Base.

Although the State of Alaska has not yet submitted a spaceport license application, we are working with that state on its environmental assessment of a proposed launch site. We hope to provide Alaska with FAA comments on their contributions to the environmental assessment in the immediate future.

New Mexico and Virginia are also working on developing spaceport facilities.

Our regulatory agenda for the near term includes issuing updated spaceport and launch site regulations, but we have fairly comprehensive existing regulations and guidelines in place that would govern any current application.

With the current guidance in place, we are ready to begin the licensing process and make our best effort to meet the scheduling requirements of the applicants. We anxiously await the first application.

In the area of regulations, FAA is working on updating or issuing four rules to enhance existing regulations and guidelines. One on licensing launches from non-federal sites, one to address the financial responsibilities inherent in launches, and spaceport regulations and reusable launch vehicles.

I expect that the notices of proposed rulemaking on the first two efforts will be issued before the end of the year. We intend to meet industry's stated need to have reusable launch vehicle regulations in place to support a decision that NASA will make in 1999 to build a full scale operational reusable launch vehicle.

As to updating existing spaceport regulations and guidelines with a more evolved rule, reflecting recent developments in the spaceports arena, the Interagency Working Group on Spaceport Issues will provide feedback and analysis that will enable us to draft comprehensive regulations to address this evolving aspect of commercial space.

The FAA, in coordination with DOD, is co-chairing an interagency working group focused on developing broad policy guidelines to define the most important aspects of Federal Government interaction with proposed spaceports.

This IWG is structured to report its findings and recommendations to the Office of Science and Technology Policy and the National Security Council for review and approval.

We expect these guidelines to be completed this summer. At a minimum, they will address issues such as safety, financial responsibility, environmental compliance, use of government property, use of foreign launch vehicles on U.S. ranges.

Mr. Dave WELDON. Mr. Weaver, please summarize. Your time has expired.

Mr. WEAVER. Okay.

And these issues will be more fully addressed in the spaceport licensing rulemaking.

Let me just summarize by saying that our office has recently restructured to make sure that we can update the existing regulations as well as provide new regulations in support of spaceports and new launch systems.

Thank you for providing me with this opportunity to testify here this morning, as well as for your leadership in this area.

And I look forward to hearing the testimony of my fellow panel members, as well as state and industry spaceport advocates.

[The prepared statement of Mr. Weaver follows:]

STATEMENT OF FRANK C. WEAVER, ASSOCIATE ADMINISTRATOR FOR COMMERCIAL SPACE TRANSPORTATION, FEDERAL AVIATION ADMINISTRATION, BEFORE THE HOUSE COMMITTEE ON SCIENCE, SUBCOMMITTEE ON SPACE AND AERONAUTICS, CONCERNING U.S. SPACE LAUNCH STRATEGY. JUNE 12, 1996.

Mr. Chairman and Members of the Subcommittee:

I am pleased to appear on behalf of FAA Administrator David Hinson today to discuss U.S. space launch strategy. Before I address what FAA and its space transportation line of business are doing to be ready for the future U.S. space launch industry, both in terms of maintaining the highest level of safety and in doing our part to ensure U.S. competitiveness in the field, I would like to provide a brief history of the industry to set the stage for discussion of current developments.

In 1984, the United States was the clear launch leader in the Western World, using the space shuttle to launch payloads for this Nation, as well as most of its allies. Expendable launch vehicle (ELV) production had been phased out for the most part, and NASA provided launch services for both government and commercial payloads. The Challenger tragedy brought U.S. commercial launch activity to a virtual standstill.

With no U.S. alternatives, the-then relatively new European Space Agency (ESA) built up a significant lead in launch contracts, utilizing its Ariane rocket. The decision of the United States in 1986 to eliminate the majority of commercial payloads from future shuttle flights encouraged the re-establishment of production lines for some ELVs, such as the Atlas and Delta rockets, and encouraged others to enter the reinvigorated field of commercial space launches.

With the first U.S. commercial space launches in 1989, the United States began to reassert itself as a leader in the launch business. Although there inevitably have been ups and downs, today the picture is encouraging, and the future for U.S. commercial space launches looks very bright.

The United States led the world with 12 ELV launches in 1995, more than the ELV launches of NASA and the Department of Defense combined. There have been 8 commercial, licensed launches so far in 1996 -- all successful -- with 10 more expected by year's end.

The commercial launch industry is driven by payload demand, and the number and variety of payloads is unquestionably up, and continuing to rise. According to a space market analysis in *Aviation Week and Space Technology* earlier this year, about 1,000 satellites will be launched worldwide between now and the year 2000.

From the launch activity that is taking place, it is clear that the industry is changing, from a market driven by institutional scientific and national security demands, to one powered by private sector initiatives. It was frequently said that commercial space activity would begin to grow when people figured out more ways to make money in space, and that's what corporate America is doing.

Communications payloads still dominate private sector activities. International and long-distance telephone and television transmission have long been the primary satellite users. However, the proliferation of new satellite technologies has resulted in the use of commercial space launches for putting a much broader spectrum of services in place.

Still an important and growing part of commercial space activity, communications developments have included independent international telephonic services, multimedia systems, and establishment or enhancement of communications in areas such as the Pacific Rim, where vast distances between island-based settlements and the lack of terrestrial facilities make communicating by satellite the most viable option. There have also been some newer, interesting satellite communications developments. 1995 saw the introduction of satellite-to-subscriber TV, involving the use of 18-inch home satellite dishes, capable of receiving hundreds of television channels.

Another growing segment of commercial space is the earth-imaging field. What had been a technology dominated by the military, or used primarily for weather observation, is taking on a different character with broader application, with new participants entering the field. The U.S., France and Russia are currently major participants in this area, with U.S. companies developing multi-purpose, high-resolution imaging systems. Europe, Japan, India, Canada and others either

already have satellites up, or are planning to launch. *Aviation Week* has estimated that there are about 50 earth-imaging satellites alone planned for launch through the year 2000.

Another evolving satellite technology is the use of low-earth-orbit (LEO) satellites to carry out a variety of communications and tracking services, such as remote monitoring of water quality in the Northwest, checking the condition of underground pipelines by reading electronic corrosion sensors, and tracking the location, condition and security of shipping containers in transit. The same system can be used for paging and messaging services, and to provide tracking of tractor trailers and the like.

Potentially one of the largest developments in commercial space is the development of LEO and medium-earth-orbit (MEO) communications systems promising to provide direct voice communications by hand-held wireless phones between any two points on the Earth's surface. These proposed systems would use constellations of varying numbers of small satellites. One wireless communications concept would require more than 800 satellites, while others include up to 66. Obviously, this would have significant implications for the launch segment of the commercial space industry.

In short, it would appear that development and use of satellite-based technologies is far from tapped, and this means that commercial space launches will continue to grow in number, as well

as to evolve in character, over time. What the United States must be mindful of is the need to ensure that the commercial space transportation industry grows safely as it assumes even greater prominence in the international market. We must also plan for the future of commercial space transportation, which, in addition to growth, foresees development of private-sector and consortia spaceports, reusable launch vehicles and re-entry sites. Working cooperatively with the key government players involved in space transportation, FAA is involved in several efforts to efficiently oversee the industry and guide its growth in an intelligent manner.

One example of a significant change that lies ahead in the commercial space industry is the development of commercial launch sites, or spaceports. Currently, 5 states have such efforts underway, with others having expressed interest. The Florida Spaceport Authority, operating at Cape Canaveral Air Station, is in the process of converting an unused launch pad for the commercial use of several smaller launch vehicles. California's Spaceport Systems International is developing similar capability at Vandenberg Air Force Base.

New Mexico is working on a facility for commercial space activity adjacent to White Sands Missile Range, Virginia is promoting commercial activity at NASA's Wallop Flight Facility on the Atlantic Coast, and, as you will hear later this morning, Alaska is proposing to develop a site for polar launches from Kodiak Island's southern tip. FAA is currently reviewing Alaska's work

in support of the Environmental Assessment (EA) submitted for this site, and is working closely with the state to complete that Assessment.

Our regulatory agenda for the near-term includes issuing updated spaceport/launch site regulations, but we have fairly comprehensive existing regulations and guidelines in place that would govern any current application. With the current guidance in place, we are ready to begin the licensing process to meet, as nearly as possible, the scheduling requirements of the applicants. We anxiously await the first application.

The Interagency Working Group on Spaceport Issues will provide feedback and analysis that will enable us to draft comprehensive spaceport rules, and to address as part of that effort the issues associated with the development of commercial space launch sites in the United States, such as safety, financial responsibility, environmental compliance, use of government property and services for launches, and launches of foreign vehicles from commercial sites located on Federal launch ranges within the U.S.

Another development that NASA Administrator Goldin has already addressed is the development of the reusable launch vehicle, which, while several years away, will profoundly change the commercial launch market. I am pleased to serve on the source evaluation committee to review reusable launch vehicle proposals, along with NASA and industry. This is an exciting

process, and one which will help to refine FAA's role in regulating this aspect of the industry. Planning for that eventuality, FAA's reauthorization proposal for FY 1997 and beyond contemplates providing the FAA with the basic authority to regulate reusable launch vehicles, as well as reentry sites.

Development is also ongoing in the area of Evolved Expendable Launch Vehicles, or EELVs, and I serve as a member of the source selection advisory council formed to review industry proposals and provide input to ensure that commercial needs are addressed in the eventual design.

As to our role in international launch trade agreements, in addition to supporting USTR in negotiation of those agreements, FAA chairs, as well as works within, the Interagency Working Group on Information with the Departments of Defense, State, and Commerce to analyze and monitor trade agreements for compliance, providing the results of that analysis to USTR. We also provide market analysis to USTR, such as reports on satellite payloads and LEO market assessments.

I would like to conclude my testimony this morning by updating you on some ongoing projects at FAA in which the Subcommittee has expressed interest.

This week, we restructured the Office of Commercial Space Transportation in a manner we believe better supports safety and international competitiveness. We have completed a move to "flatline" the organization into two realigned divisions: Licensing and Safety, and Space Systems Development. Part of the FAA advantage is that we are benefiting from the agency's new personnel system by being able to move forward in filling several positions, including the positions of Chief of Regulations and Manager of Space Systems Development. We also hope to announce our permanent selection for the position of manager of the Licensing and Safety division within the next few weeks.

We are in the process of developing more detailed regulations on licensing commercial launch sites and launches from non-Federal sites, as well as regulations dealing with the financial responsibility aspects of launches. We hope to issue Notices of Proposed Rulemaking later this year. By the 1999 decision to proceed with an operational reusable launch vehicle, the FAA intends to have these final regulations in place.

That completes my prepared statement, Mr. Chairman. I would be pleased to respond to any questions you may have at this time.

Mr. Dave WELDON. Thank you.

Mr. Eiss, please?

STATEMENT OF DONALD W. EISS, DEPUTY ASSISTANT UNITED STATES TRADE REPRESENTATIVE FOR INDUSTRY; and CATHERINE NOVELLI, DEPUTY ASSISTANT UNITED STATES TRADE REPRESENTATIVE FOR EASTERN CENTRAL EUROPE AND EURASIA

Mr. EISS. Good morning, and thank you, Mr. Chairman.

It's a pleasure to appear on this panel and have the opportunity to discuss our bilateral agreements on trade and space launch services and the competitiveness of U.S. industry in the international marketplace of space.

Before turning to the three space launch trade agreements we have negotiated, my colleague and I, Ms. Novelli, would like to briefly touch on the basic policy framework on space within which our agreements operate.

The goal of U.S. Government commercial space policy is to support and enhance U.S. competitiveness in commercial space while protecting U.S. national security and foreign policy interests.

A viable presence in the commercial market for space launch services using expendable launch vehicles is one important market segment covered by this strategy. It is the one to which our trade agreements are specifically directed.

But it is not the only market segment involving commercial space activities. Others include satellite manufacturing, satellite communications systems operators, and more recently spaceports.

Our policies regarding international trade in space launch services must take account of the competitive position of U.S. industry in all these sectors.

U.S. goals and objectives for our bilateral space launch agreements include:

Providing access for our satellite manufacturers for the first time to launches on foreign vehicles from economies in transition;

Providing safeguards against unfair or disruptive practices by foreign space launch providers in those transitional economies. This assures U.S. launch service providers a real opportunity to compete in those areas where they have the capability.

And third, ensuring that the agreements are sufficiently flexible to take account of the changing market conditions, such as changes in demand.

The Administration, over the past year and a half, has renegotiated agreements on commercial space launch services with China and Russia, and negotiated a new agreement with Ukraine. While the individual agreements differ in some details, the basic provisions of all are quite similar.

First, they limit the number of launches of satellites to geostationary earth orbit by each country.

Each bilateral agreement contains a country-specific limit on the number of launches to GEO it may conduct over the life of the agreement.

Second, they establish norms of behavior for launches to the emerging low earth orbit (LEO) market.

The agreements make clear that disciplines on pricing and unfair trade practices, which were first developed for the GEO market, also apply to the LEO sector.

These provisions will enable us to ensure that U.S. launch providers have a fair opportunity to compete in the LEO market as well as the GEO market, without interfering with the development of the LEO market.

Third, they establish disciplines on the pricing of launch services by the PRC, Russia and Ukraine.

The agreements require that prices offered on launch services be comparable to the prices offered by market economy countries including the U.S.

Applying pricing disciplines is complicated. Each launch and each launch package generally involves unique elements that preclude simple comparisons of launch bids.

We've taken a number of steps to address this complexity, which I'm sure we will discuss and I've enumerated in my testimony, and I'm sure we'll be discussing in the questions and answers.

In addition to the three key features described above, each of the agreements also clearly state the United States retains the right to take any action permitted under its laws and regulations. As such, we retain complete flexibility to consider and ultimately to invoke appropriate provisions of the U.S. laws to ensure that the agreements are enforced.

These agreements are considered trade agreements by the United States. Violations of provisions of these agreements would fall within the scope of Section 301 of the Trade Act of 1974.

Under Section 301, the USTR is authorized to take a variety of actions in response to trade agreement violations. If USTR determines that the rights of the United States under a trade agreement are being denied, then the USTR is required to take action, subject to the direction of the President, against the offending country unless a satisfactory resolution is found.

Very briefly, I will just quickly summarize the conclusions in the China agreement, and Ms. Novelli will briefly address the Russian and Ukraine agreements.

The current agreement with China was signed on March 13, 1995. The agreement limits the PRC to 14 launches to GEO over the seven-year period of the agreement. If demands for commercial launch services worldwide is substantially greater than market projections, the new agreement provides flexibility with respect to these limitations.

Mr. Dave WELDON. Mr. Eiss, your time has expired, but if you want, we can give Ms. Novelli five minutes and she can give some of that back to you.

Mr. EISS. I only have one more sentence.

Mr. Dave WELDON. Okay, great.

Mr. EISS. I only have one more sentence.

The 1989 agreement with the PRC, which our most recent agreement succeeded, was the first space launch trade agreement negotiated by the U.S. Government. The operation of the agreement's pricing provisions was a source of on-going concern, both to our commercial space launch industry and the U.S. Government. Those

concerns led us to insist that the renewed agreement contain the new pricing disciplines described earlier in my testimony.

And now I'd ask Ms. Novelli to address the Russian and Ukraine agreements.

Mr. Dave WELDON. Ms. Novelli?

Ms. NOVELLI. Thank you, Mr. Chairman. I'll be very brief.

The Russia agreement was renegotiated in 1996. There was an earlier 1993 agreement. And in almost all aspects, it is identical to the agreement that was negotiated with China.

We can discuss a few of those provisions if you'd like to in questions and answers.

The key provisions are the amount of GEO launches that are allowed to be won by the Russian government is that they are allowed to win up to 15 launches to GEO. And if the market is significantly more robust, they'll have the possibility to submit contracts for up to four additional launches.

I would add that in making the policy decisions on China, Russia and Ukraine, the Administration consulted very intensely with all aspects of U.S. industry, the satellite industry, the commercial launch industry.

And as you've noted, it's a very complicated situation since the commercial launch industry is involved with Russia and the Ukraine, particularly in joint ventures, and in coming up with these numbers, we wanted to make sure that we gave them the opportunity to actually work with the Russians and Ukrainians to bring about the kind of changes that you specifically addressed as needed in your own opening statement, such as bringing a more market-oriented approach.

With respect to Ukraine, we encountered a very unique situation and we hope that we came up with a very unique solution to that situation which was a U.S. joint venture that was going to be majority controlled by the United States, and we wanted to give that venture an opportunity to the U.S. launch operators.

So what we did with Ukraine in terms of the ability for Ukraine to launch to GEO was that Ukraine could have five launches for itself but then 11 launches would be reserved specifically and only for the use of the joint venture, which will really go down to the benefit of the United States.

In addition, if the market is more robust, there are four extra launches that could be won by Ukraine. However, three of those again are reserved specifically to the joint venture. So again, we tried to take account of and give the most opportunity to the U.S. launch provider as opposed to simply handing things over to a foreign government and their opportunity.

I would say in closing that this is a very complicated situation. It required a lot of balancing, and we believe that our approach on China, Russia and Ukraine provides the balance and the effectiveness that is needed to deal with this very complicated and changing situation.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Eiss and Ms. Novelli follows:]

STATEMENT OF

DONALD W. EISS
DEPUTY ASSISTANT UNITED STATES TRADE REPRESENTATIVE
FOR INDUSTRY

AND

CATHERINE NOVELLI
DEPUTY ASSISTANT UNITED STATES TRADE REPRESENTATIVE
FOR EASTERN CENTRAL EUROPE AND EURASIA

ON

INTERNATIONAL COMPETITION AND U.S. COMPETITIVENESS IN SPACE
AND INTERNATIONAL SPACE LAUNCH TRADE AGREEMENTS

BEFORE THE

U.S. HOUSE OF REPRESENTATIVES COMMITTEE ON SCIENCE

June 12, 1996

Good morning, Mr. Chairman. It is a pleasure to appear on this panel and to have the opportunity to discuss our bilateral agreements on trade in space launch services and the competitiveness of U.S. industry in the international marketplace for space.

Your letter of invitation identified three questions that you wished to address during this hearing. We will focus our remarks on the specific contribution that international space launch trade agreements are designed to play in addressing the international competitiveness of U.S. industry and workers, as well as our efforts to adapt these agreements to the rapidly changing conditions of competition in the commercial launch market.

Before turning to the three space launch trade agreements we have negotiated, we would like to briefly touch upon the basic policy framework on space within which our agreements operate.

The goal of U.S. Government commercial space policy is to support and enhance U.S. competitiveness in commercial space while protecting U.S. national security and foreign policy interests. A viable presence in the commercial market for space launch services using expendable launch vehicles is one important market segment covered by this strategy. It is the one to which our trade agreements are specifically directed. But it is not the only market segment involving commercial space activities. The U.S. is the world leader in satellite manufacturing and has been since the first commercial communications satellite was launched in the 1960's. However, U.S.

satellite manufacturers must strive to maintain that world leadership position in the face of ever increasing competition from foreign satellite manufacturers and alternative telecommunication mediums such as fiber optic cable. Somewhat more recently, the operation of satellite communications systems has become an active area for private competition both internationally and domestically, and U.S. companies are at the forefront in this field. Our domestic spaceports are also seeking to establish their competitiveness as providers of space launch infrastructure in the world market for commercial launches. Our policies regarding international trade in space launch services must take account of the competitive position of U.S. industry in all these sectors.

We would also underscore the importance of the Clinton Administration's commitment to the modernization of existing space transportation capabilities (inter alia, through the Evolved Expendable Launch Vehicle program) and the development of improved future capabilities (inter alia, through the Reusable Launch vehicle program). Other administration witnesses will describe those aspects of the Administration's policy in detail, which are critical to assuring that the U.S. space launch industry will continue to provide reliable and affordable launch services into the next century.

TRADE AGREEMENTS

U.S. goals and objectives for our bilateral space launch agreements include:

-- providing access for our satellite manufacturers for the first time to launches on foreign vehicles from economies in transition;

-- providing safeguards against unfair or disruptive practices by foreign space launch providers in those transitional economies. This assures U.S. launch service providers a real opportunity to compete in those areas where they have capability.

-- ensuring that the Agreements are sufficiently flexible to take account of changing market conditions such as changes in demand.

In addition, international space launch trade agreements in which the U.S. is a party must conform to U.S. obligations under arms control agreements, U.S. non-proliferation policies, U.S. technology transfer policies and U.S. policies regarding observance of the Guidelines and Annex of the Missile Technology Control Regime (MTCR).

Key Elements of the Agreements

Under the President's constitutional authority to negotiate with foreign governments, the Administration over the past year and a half has renegotiated agreements on commercial space launch services with China and Russia and negotiated a new agreement with Ukraine. We have

made copies of the agreements available to the Committee. All three of these agreements are now in force. While the individual agreements differ in some details, the basic provisions of all are quite similar.

First, they limit the number of launches of satellites to geostationary earth orbit (GEO) by each country

Each bilateral agreement contains a country-specific limit on the number of launches to GEO it may conduct over the life of the agreement. This country-specific approach provides the most certainty for all affected participants (potential users, U.S. launch services companies, the prospective foreign launch service provider) regarding the extent of participation permissible under the agreement This creates the most reliable framework within which business plans can be developed and executed.

At the same time, we realize that the aggregate impact of launches to GEO permitted under all three agreements is also important to ensuring that adequate opportunities remain for U.S. launch service providers. The limits set in the individual agreements reflect a careful review of the various estimates of the aggregate market size for launches to GEO in the future. Our examination of the prospects for future evolution of the market involve all government agencies with expertise in this area Moreover, we discuss the question of future market size in detail with private industry at every stage of the negotiation of an agreement.

Of course, in a market changing as rapidly as satellite communications, predicting demand over the next seven years with precision is difficult Based upon our own internal expertise and the input from the private sector, we believe that even if the more conservative estimates of the growth in demand for commercial space launches prevail, the limits set in these agreements will still allow for continued U.S. participation as a significant player in the world market. If, as most analysts now believe, the growth of the market is considerably more vigorous, the agreements have a number of triggers allowing the limits to be raised to help meet the needs of satellite manufacturers and system providers. Under these circumstances, of course, the market opportunities would be even more favorable for the U.S. launch providers.

Second, they establish norms of behavior for launches to the emerging low earth orbit (LEO) market;

The agreements make clear that disciplines on pricing and unfair trade practices which were first developed for the GEO market also apply to the LEO sector. The agreements also establish guidelines to guard against market disruption in this sector, in particular taking into account the structure of proposed global mobile communications systems proposed for LEO.

The agreements explicitly recognize the right of the United States to special consultations in any instance where more than 50 percent of the initial deployment of a LEO communications satellite

constellation has been granted to China, Russia and/or Ukraine. In evaluating such situations and deciding whether to exercise this right, the United States may consider certain other factors, including, inter alia: (1) the extent of U.S. participation in the deployment; (2) the launch scheduling and deployment requirements; (3) the availability of competitively-priced market economy launches; and (4) opportunities made available for participation in the market for replacement launches. These provisions will enable us to ensure that U.S. launch providers have a fair opportunity to compete in the LEO market as well as the GEO market without interfering with the development of the LEO market.

Third, they establish disciplines on the pricing of launch services by the PRC, Russia and Ukraine:

The agreements require that prices offered on launch services from the PRC, Russia and Ukraine -- all countries in the process of transition to market economies -- be comparable to the prices offered by market economy countries, including the U.S. This provides a safeguard against commercially unsound and disruptive pricing and ensures that the prevailing price structure will be established by market forces, especially the interplay of costs, prices and profitability.

Applying pricing disciplines is complicated. Each launch and each launch "package" generally involves unique elements that preclude simple comparisons of launch bids. For example, a satellite manufacturer normally incurs substantially lower launch support costs (transportation, security, personnel support) in launching a satellite from the United States as opposed to China, Russia or Ukraine. In assessing whether bids from providers in one of those three countries are fair according to the pricing standards of the agreement, it is appropriate to adjust for the differences in cost.

Distinguishing between legitimate adjustments and adjustments that have no relevance to the agreement has been one of the most difficult issues with which we have had to wrestle as we have applied the pricing disciplines in specific competitions. We have taken a number of specific steps to address this difficulty. Each of the three agreements now contain exclusive lists of permissible adjustments for commercial launches to GEO. We believe that the additional clarity that these lists provide will improve the operation of the agreements: (a) by providing clearer guidance to launch service providers in the PRC, Russia and Ukraine as to the meaning of the pricing disciplines; and (b) by facilitating our ability to monitor pricing. Similar pricing comparability lists will be developed for the LEO market as our knowledge and experience in that business improves.

In addition, we recently introduced in the agreements -- with a view towards improving the implementation of the pricing disciplines -- a 15 percent "threshold" for evaluating GEO prices. If a bid is within 15 percent of a bid from a Western launch service provider, it is assumed to be in compliance with the pricing disciplines of the agreement, unless reliable information is provided that indicates otherwise. In the event that the pricing is more than 15 percent below Western prices, the U.S. will review the pricing in that competition, taking into account the adjustment factors listed in the agreement, and may request immediate consultations. We believe that this price band will aid in focusing attention on those transactions which could threaten the integrity of

the pricing disciplines and will, thereby, improve the overall effectiveness of the agreement. In view of the absence of mutually agreed-upon adjustment factors and our more limited experience with the LEO market, no similar price band applies to LEO.

In addition to the three key features described above, each of the agreements also:

-- establishes general disciplines of good conduct with respect to the use of government inducements, unfair business practices and subsidies;

-- requires annual consultations to review the implementation of the agreements and provides for "special consultations" at any time if a question arises regarding compliance with the agreement.

-- clearly states that the United States retains the right to take any action permitted under its laws and regulations. As such, we retain complete flexibility to consider, and ultimately, to invoke, appropriate provisions of U.S. laws to ensure that the agreements are enforced.

THE INDIVIDUAL AGREEMENTS

As I have described above, the agreements contain very similar provisions and disciplines. I would, however, like to make a few brief remarks regarding the particular provisions of each.

China

The current agreement with China was signed on March 13, 1995. It renewed the agreement we had concluded with the PRC which covered the period from 1989 to the end of 1994. The new agreement limits the PRC to 11 launches to GEO over the seven-year period of the agreement. In addition, four satellites to be launched during the period of the new agreement already have been reviewed under the 1989 Agreement and will not count against the new quota of 11. If the demand for commercial launch services worldwide is substantially greater than market projections, the new agreement provides flexibility with respect to these limitations. If commercial market demand remains robust over an extended period (defined in the agreement as 3-4 years), the GEO limits will automatically increase by up to 5 launches, phased in over the life of the agreement. Similar provisions are contained in the Russian and Ukraine agreements. These provisions reflect the emergence of very strong concerns by U.S. satellite manufacturers and systems providers about the long term adequacy of launch supply.

The 1989 agreement with the PRC was the first space launch trade agreement negotiated by the U.S. Government. China was allowed up to nine launches to GEO of satellites for international customers, although it only conducted five launches. Despite China's failure to fill the quota on launches to GEO, the operation of the agreement's pricing provisions was a source of ongoing concern both to our commercial space launch industry and to the U.S. Government. Those concerns led us to insist that the renewed agreement contain the new pricing disciplines described earlier in my testimony.

Russia

On January 30, 1996, the United States and Russia signed an agreement amending the September 1993 U.S.-Russia Commercial Space Launch Agreement. Under the amended agreement, Russia has the opportunity to win contracts for up to 15 launches to GEO (in addition to the "grandfathered" INMARSAT 3 satellite). If the demand for commercial space launch services is significantly more robust over the next few years, Russia will have the possibility to win contracts for the launch of up to 4 additional satellites, phased in over the life of the agreement. The Russian agreement provisions on pricing and the LEO market are as I described earlier in my testimony. On April 8, 1996, the first launch of a commercial satellite covered by our bilateral agreement was successfully conducted. Two more commercial launches by the Russian launch vehicle are scheduled for this year.

Ukraine

The United States and Ukraine signed a Commercial Space Launch Agreement on February 21, 1996. Under the terms of this agreement, Ukraine is permitted up to 16 launches to GEO. However, only 5 of the 16 are available for unrestricted use by Ukraine. The remaining 11 launches will only be available if a launch is conducted by a joint venture involving a U.S. firm using a Ukrainian rocket. This modification to the GEO limits used in the China and Russia agreements was necessary to accommodate the possible future entry of new U.S.-Ukrainian space launch business ventures which return significant and tangible benefits to the U.S. economy. The Boeing Sea Launch joint venture would be one such joint venture on which there has been significant speculation. In order to ensure that the provision is not abused to the detriment of other U.S. space launch interests, the agreement enumerates a number of specific conditions which must be met. A qualifying U.S.-Ukrainian joint venture must meet the following conditions:

-- the U.S. partners must maintain control in fact;

-- the U.S. must be the source of a significant share of the goods and services employed in any launch;

-- a majority of the goods and services, including financing and insurance must originate in market economy countries; and

-- the joint venture must receive a launch license from the U.S. Department of Transportation.

If the demand for commercial space launch services proves more robust over the next few years than is now anticipated, Ukraine will have the possibility to launch up to 4 more principal payloads to GEO, 3 of which must be reserved for such a joint venture involving a U.S. firm. The pricing and LEO provisions of the Ukraine agreement mirror those in the current China and

amended Russia agreements.

DOMESTIC IMPLEMENTATION AND ENFORCEMENT

Following the conclusion of the Russia and China agreements, USTR published a Notice in the Federal Register detailing our guidelines for implementing these Agreements. Those Notices directly address the question of our domestic enforcement authority and how the private sector can submit information and concerns regarding the implementation of the agreements. Each Notice states that these agreements are considered trade agreements by the United States. A violation of the provisions of these agreements would fall within the scope of Section 301 of the Trade Act of 1974.

Under Section 301, USTR is authorized to take a variety of actions in response to trade agreement violations. If USTR determines, after an investigation, that the rights of the United States under a trade agreement are being denied, then USTR is required to take action, subject to the direction of the President, against the offending country unless a satisfactory resolution is found.

The Executive Branch has a broad range of measures from which to choose under Section 301. For example, USTR may (i) suspend, withdraw or prevent the application of trade agreement concessions; (ii) impose duties or other import restrictions on the goods of the foreign country; (iii) impose fees or restrictions on the services of the foreign country; or (iv) enter into an agreement with the country that commits the country to eliminate or phase out the offending practice or provide compensation. An additional provision allows USTR to restrict the issuance of service sector authorizations in certain circumstances. Ultimately, the Trade Representative's authority under Section 301, subject to the direction of the President, encompasses any power of the President.

CONCLUSIONS

The negotiation of commercial space launch trade agreements with China, Russia and Ukraine are an important part of the Administration's policy toward our critical space industries. To serve this purpose, these agreements have changed as U.S. commercial interests have evolved. The agreements, individually and collectively, must balance a number of important government and private sector interests.

In 1989 when we first confronted the prospect of China entering the international commercial space launch market, there was no model upon which to draw in fashioning an agreement to balance various interests and to ensure that the agreements had the intended effect on the market. Since that time, we have adjusted the specific provisions of the agreements both to improve their effectiveness and to keep the agreements relevant in the light of rapidly changing business relationships and evolving estimates of supply and demand, including the emergence of entirely new commercial markets (i.e., the LEO market).

We believe that, as currently drafted, our commercial space launch trade agreements serve as a balanced and more effective approach to the achievement of U.S. objectives. Thank you.

Mr. Dave WELDON. Thank you, Ms. Novelli.

Before we adjourn for this very important journal vote, I'd like to ask Mr. Walker, the Chairman of the Full Committee, if he has any comments he'd like to make?

Mr. WALKER. Thank you, Mr. Chairman.

I'm delighted that we had this hearing in cooperation with the Administration coming up here and testifying. I will look forward to asking some questions when we get back from this very important journal vote.

Mr. Dave WELDON. I thank the Chairman.

We will adjourn for 15 minutes.

[Recess.]

Mr. Dave WELDON. The hearing of the Subcommittee will now begin the questioning phase of the hearing of this first panel.

I'd like to begin by addressing some questions to Mr. Eiss and Ms. Novelli, and I'd like you to clarify some of the provisions of the commercial launch trade agreements that we've spoken about and each of the new agreements with Russia, China and the Ukraine, there are provisions requiring those countries to abide by fair pricing and trade practices, basically the same in each country.

They stay within 15 percent of the equivalent commercially available LEO or GEO stationary launch.

Is that correct?

Mr. EISS. It's slightly different than that. What the agreements say is, based on our comparison, as long as the price is within 15 percent, it will be assumed, unless we have information to the contrary, that it is in compliance and that if it is more than 15 percent below, we will then engage in a more detailed examination and consult with U.S. industry and potentially engage the foreign government in a more detailed discussion.

It is not an obligation on their part to stay within 15 percent, no.

Mr. Dave WELDON. So if you have a launch and a U.S. or European provider has put in a bid, say, for $50 million, and the Chinese or the Russians come in with a bid of $40 million, which by my calculations is 20 percent below the market economies, this would be a perceived violation of the agreement? Is that correct?

Mr. EISS. Again, it's slightly different in that if it is more than 15 percent below, the agreement provides that it gives rise for the United States Government to investigate that competition much more carefully and consult with U.S. industry, and that may lead to our approaching that government and saying, we believe you're not in compliance.

For that matter, even within 15 percent, if we have some other information that would lead us to believe otherwise, we'd have a right to request those consultations as well.

Mr. Dave WELDON. We've had a series of meetings between your office and mine. And I've prepared a chart which I have on display over here. Based on the information that has been made available to me, which essentially shows that none of the previous launch agreements come even remotely within the 15 percent range.

Some of these launches have actually occurred, under the previous agreement, at a 7.5 percent trigger factor. And as far as I'm concerned, this constitutes a blatant violation of the principles that are laid down in the launch agreements.

Furthermore, we've had a series of meetings where I've attempted to get information on pending launch contracts, and we've had absolutely no data provided to my office or this Committee, as to whether or not these future launches are going to be agreeing with the 15 percent provision that you've spoken about.

Do you have any comment to this?

Because, as far as I'm concerned, you know, the issue here is why have the agreement if we're not going to make any effort to try to come within the scope of the agreement?

The impression that's generated is that you cannot enforce the agreement, additionally that no attempt is being made to enforce the agreement.

I have to say that not only for the people of my district, but as well for all the people all across the country, whether it be in California where some of our domestic launch vehicles are manufactured, or whether it be in some of these new emerging spaceports, to have these launch agreements where basically these foreign nonmarket economies have the ability to produce vehicles at government expense, that are competing with our industry.

It has a tremendous ability to undercut our domestic industry.

And let me give you a minute or two to respond. I'm sorry. I've consumed most of my own time here but this is a major issue of concern to me, and I believe the Committee.

Mr. EISS. I will apologize that I'm going to take a moment to deviate from the substance of your question. I believe I need to make a couple of comments with respect to the chart.

I need to clarify for the record the fact that that chart is not a chart of the United States Trade Representative, and the source of the material on that chart is not USTR information.

We have had a number of discussions about our history under the pricing provisions of the agreement, and indeed we came prepared here today to submit for the record to the members, a table which does indeed parallel the information that you have put on your chart as it relates to I believe the first one, two, three, four, five where there are actually pricing percentages associated with them.

And I will submit that chart for the record for your consideration.

[The following information was received for the record:]

DEPUTY UNITED STATES TRADE REPRESENTATIVE
EXECUTIVE OFFICE OF THE PRESIDENT
WASHINGTON, D.C. 20506

JUL 9 1996

The Honorable Robert S. Walker
Chairman
House Committee on Science
U.S. House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

Thank you for the opportunity to clarify for the record certain items of information following the June 12, 1996 Subcommittee on Space of the House Science Committee hearing. Attached is the chronology and a summary of the Office of the U.S. Trade Representative's consultations with both Congress and industry regarding the China, Russia and Ukraine commercial space launch trade agreements. The information is derived directly from meeting schedules and attendance lists used in the ordinary course of business at USTR. In the time available, we have not been able to confirm that the list is comprehensive, but it should help to assure the Committee that USTR did consult industry and Congress on this subject. In addition to the scheduled formal meetings and briefings that are chronicled, there were numerous other interagency meetings (including all relevant agencies and affected parts of the White House), plus additional informal contacts and telephone calls between USTR and industry representatives. I have also attached the chart Mr. Don Eiss, Deputy Assistant USTR and Ms. Cathy Novelli, Deputy Assistant USTR, presented to the House Space Subcommittee on June 12 regarding the pricing data for China launches under the first China Agreement.

These documents show that throughout the Administration's negotiations on each of the three agreements, we invited representatives from the space launch and satellite industries to each Administration briefing regarding the negotiations, and they usually attended. In addition, usually at our initiative, we briefed Congressional staff either by telephone or in person during the course of this period. Either I or my predecessors or USTR staff contacted personally members of Congress who had written to USTR with concerns about the agreements.

The consultation process does not end when trade agreements enter into force. We have established a process of continued industry consultations to ensure that our trading partners are complying with the terms of the Agreements. If any member of industry is not satisfied that these countries are adhering to the space launch agreements, we welcome their advice.

The Honorable Robert S. Walker
Page Two

Mr. Chairman, there is a long tradition at USTR, respected in both Republican and Democratic Administrations, of thorough consultation in connection with trade agreement negotiations. Ambassador Barshefsky, the Acting USTR, and Ambassador (now Secretary) Kantor before, are deeply committed to such consultations. Space launch trade negotiating policies have benefitted from such consultations. Suggestions to the contrary are not supported by our records.

I would hope that you will use this information to correct the record as to USTR's and the Administration's space launch agreements negotiating strategy, policy and consultative process. If there is any other way I can be helpful to you or the Committee, please let me know.

Sincerely,

Jeffrey M. Lang
Deputy United States Trade Representative

Attachments

cc: The Honorable George Brown
Ranking Member, House Committee on Science

Second U.S.-People's Republic of China (PRC) Commercial Space Launch Agreement
- Initialed, January 30, 1995

The Office of the U.S. Trade Representative's consultations with both the private sector and Congress commenced from the earliest stages of these negotiations and continued over the entire negotiating period. The USTR's first negotiating session with the People's Republic of China (PRC) was in mid-September 1994. In July/August, prior to developing the Administration's negotiating strategy, the Office of the USTR met with individual companies to solicit their views on whether the U.S. should re-negotiate the agreement and, if so, what the negotiating priorities should be.

With regard to Congress, USTR consulted with staff to the House Committee on Science, Space and Technology before the first negotiating session with the PRC. On September 29. 1994, the Office of the United States Trade Representative testified before the House Committee on Science, Space and Technology regarding global trade in launch services. USTR was represented by two witnesses, including Mr. Donald M. Phillips, Assistant USTR for Industry and head of the U.S. delegation negotiating with the PRC. Mr. Phillips used his testimony as an opportunity to reiterate to the Committee the Administration's decision to pursue renegotiation of the agreement with China and improve its provisions.

Over the negotiations with the PRC, USTR maintained a comprehensive and constant dialogue with industry. The USTR-chaired interagency team met with industry as a whole, prior to and after each negotiating round with the PRC -- a total of eight times -- to review developments in the negotiations and possible U.S. proposals and strategies. Over that same period, and in addition to these group meetings, USTR met with individual companies on at least 20 separate occasions, which included meetings at the Cabinet and Subcabinet level.

Contacts with the Congress also were maintained throughout these negotiations. On December 5, Assistant USTR Donald Phillips, consulted with staff to the Subcommittee on Space regarding the status of the China negotiations. On the day the agreement was initialed, the USTR Office of Congressional Affairs sent the press release regarding the successful conclusion of the negotiations to the House Space Subcommittee and other relevant Congressional Committees. That information was quickly followed up by briefings conducted by Mr. Donald W. Eiss, Deputy Assistant USTR. On February 2, 1995, Mr. Eiss met with the House Space Subcommittee staff and on February 16, 1995 he briefed interested Senate staff.

U.S.-Ukraine Commercial Space Launch Agreement
- Initialed December 14, 1995

Before the conclusion of the Ukraine negotiations, on December 6, 1995, Deputy USTR Jeff Lang briefed staff to the House Space Subcommittee, in conjunction with the House Ways & Means Trade Subcommittee staff on these ongoing negotiations. That week, he telephoned, as did Cathy Novelli, Deputy Assistant USTR for Europe and the Mediterranean and Mark Mowrey, Director for European Regional Affairs in the USTR Office of Europe and the Mediterranean, interested Congressional staff. These calls included the staff to various members of the Florida and California Congressional delegations, who had written to then-USTR Mickey Kantor about concerns with the ongoing negotiations.

In early December upon speaking to staff to Congressman Dave Weldon (R-FL), congressional staff remarked to USTR staff that this was a difficult negotiation because of the divergent industry interests. Staff acknowledged that he had been made aware of the USTR negotiating position from alternative sources and he had many questions which were answered by USTR to his apparent satisfaction.

Throughout the Ukraine negotiation process, USTR met with other agencies and industry representatives on many occasions. For instance, the Office of the USTR conducted meetings in the normal course of developing negotiation policy with the U.S. Air Force, NASA, Joint Chiefs of Staff. Office of Science and Technology Policy, National Security Council, National Economic Council, Departments of Commerce, Defense, State, Transportation, and Treasury on March 30, April 11, June 28, June 29, July 6, July 12. and August 10, 1995.

In conjunction with the above listed agencies, USTR consulted with industry on the following occasions regarding the Ukraine Agreement: April 19, May 2, July 5, December 7, 1995 and January 17, 1996. The Office of the USTR and other agencies met solely with McDonnell-Douglas on September 18, 1995 when McDonnell-Douglas raised particular concerns and issues about the Ukraine Agreement. Similarly, Deputy USTR Jeff Lang met with high-level representatives and officials of McDonnell-Douglas, on October 2, 1995, and again on November 2, 1995, to discuss McDonnell-Douglas' views on the Ukraine agreement negotiation policy and strategy.

U.S.-Russia Commercial Space Launch Agreement
- Signed, January 30, 1996

As discussed in the China Agreement section above, the negotiations for the U.S.-Russia Commercial Space Launch Agreement were raised in the testimony and in the question and answer session in a public hearing before the House Science Committee on September 29, 1995 by Assistant USTR Don Phillips and Assistant USTR Peter Allgeier.

As the negotiations for amendments to this agreement were coming to a conclusion, on January 18 and 19, 1996 Deputy Assistant USTR Cathy Novelli and Mark Mowrey briefed Space Subcommittee staff, along with other interested Committee staff regarding the then-current U.S.-Russia commercial space launch negotiations. These briefings were prior to the conclusion of the negotiations. Members of the Florida delegation (staffs to Senator Graham (D-FL), Senator Mack (R-FL) and Congressman Dave Weldon (R-FL)) were also briefed in separate meetings regarding the negotiations.

Concerns of certain industry in Florida were raised to USTR officials in these meetings and telephone calls, but USTR officials were not asked to halt negotiations nor were USTR officials asked to reopen the interagency trade policy review process supporting these negotiations. USTR was asked to take all of industry's concerns into account, which USTR did, and continues to do, during the negotiations. In fact, at one Congressional briefing in January, USTR briefed staff to the Florida delegation, in conjunction with a representative from the Florida spaceport authority. USTR officials were told that the negotiation was proceeding upon a fair course of action.

During Russian negotiations, USTR again periodically met with agency and industry representatives. On January 16, 1996, USTR conducted a meeting with other agencies, listed above in the Ukraine section. In conjunction with these agencies, USTR then briefed industry on January 17 and February 1, 1996.

Since that time, Deputy Assistant Jeff Lang met with Congressman Dave Weldon on March 1, 1996 to discuss the role that the state of Florida's commercial space launch interests plays in the Administration space policy and the Agreements with China, Ukraine, and Russia. Since that original meeting, USTR staff, in conjunction with the Department of Transportation, has met with Congressman Weldon, his staff and members of the Space Subcommittee staff, on four other occasions: March 27, April 26, June 3, and June 10, 1996.

Finally, the Office of the USTR testified, in conjunction with the Departments of Defense, Transportation and the Office of Space and Technology Policy at the House Space Subcommittee hearing, chaired by Representative Dave Weldon (R-FL) on June 12, 1996.

PRICING COMPARISONS UNDER U.S. BILATERAL SPACE LAUNCH TRADE AGREEMENTS

CHINA

FIRST AGREEMENT (1989 - 1994)

SATELLITE	RESULT OF COMPARISON TO WESTERN PRICES
A	22 - 30% BELOW
B	23 - 28% BELOW
C	28 - 36% BELOW
D	26 - 35% BELOW

RUSSIA

SATELLITE	RESULT OF COMPARISON TO WESTERN PRICES
A	30 - 35% BELOW

Prepared by the Office of the
United States Trade Representative
June 12, 1996

Mr. EISS. However, as it relates to the remainder of the material on that chart, I cannot comment at all or give you any, be able to say whether that's correct, inaccurate, or it certainly whatever, because I'm not aware of the satellites to which you're referring.

And in particular, if I may, if I may finish, in particular——

Mr. Dave WELDON. My time has expired, and if one of the other members wants to yield further time to this discussion, I'd be happy to allow that.

Most of the data on there is no data provided, which is what we have gotten out of your office. And one of the responsibilities of the Committee is to provide oversight. And it has been impossible for us to provide any oversight on this issue because we're not getting any data provided.

With that, I'd like to turn to Mr. Cramer for questions.

Mr. CRAMER. Thank you, Mr. Chairman.

I also want to welcome the panel members today. I didn't get an opportunity to do that earlier. This is an important issue for us to address space transportation issues.

It's important for NASA, it's important for the launch industry, as well.

I'm going to ask a series of questions.

Mr. Goldin, most of these probably will be more appropriate for you to talk about.

But transportation costs are a significant part of NASA's budget. And so I think it's very important that we look at that.

As well, Ariane of France currently holds two-thirds of the commercial launch market. Other countries, such as China, hold another ten percent of that market. As you say, that leaves us with about 30 percent.

Only a decade ago, we monopolized the market share.

Would you talk about the RLV program and the AST program and talk about how important those programs are to help the U.S. launch industry regain its edge and distinguish between the two. Because, as I understand it, there are certain transportation issues that are covered by the AST program that are not covered by the RLV program.

Mr. GOLDIN. Certainly the reusable launch vehicle program has an intention to leapfrog technology so we could price the value, not price the commodity in the market.

It is a very significant investment to really push ourselves way ahead of all other vehicles in the world and value pricing is really what most industry looks to do.

The RLV program is a program that we want to undertake, looking at three different vehicles, the Clipper Graham which we just flew in the desert at White Sands, the X-34 and the X-33.

We also are going to do flight testing and ground testing to prove that we have mastered the critical technologies of reusability, operability, low cost, rapid turnaround time, and to do testing on the ground and in flight so we can validate that we have these technologies in hand, so that the commercial industry could take it over and develop and operate launch systems.

This is a series of tests and experiments that will take us through the end of this decade for the second generation reusable vehicle. That's the RLV program.

The Advance Spacelift Technology Program is taking it to a third and fourth generation. Right now, we're limited to using rocket engines where we have to carry all our oxygen and all our fuel.

The next generation system in the AST program will be attempting to scoop up some air to make the engines yet more efficient.

In addition, the Advanced Spacelift Technology program is attempting to break through in ultra lightweight launch vehicles so we can open up a whole new sector for commerce and academia. That is to get a vehicle set of technologies that could allow us to take 100 to 200 kilograms into orbit under a million dollars, and to bring in a whole series of new supplies and have components sitting on the shelf so entrepreneurs could go buy the components they need and move forward with whole systems, and finally to do orbit-to-orbit transportation, which is also seriously outdated.

Mr. CRAMER. What part of NASA's budget are transportation costs right now?

Mr. GOLDIN. If we summed everything up, I would say that transportation is awfully close to one-third.

Mr. CRAMER. Thank you, Mr. Chairman. I yield back my time.

Mr. Dave WELDON. I'd like to recognize the gentleman from California, Mr. Rohrabacher.

Mr. ROHRABACHER. Thank you very much, Mr. Chairman.

Let me just say for the record, that I appreciate your aggressive activities on behalf of America's space program. You are indeed an activist on this issue. And it's been a privilege working with you in this last year and a half.

I'm sure that you are destined for leadership in the future of the American space program.

I know we had a test of DCX this weekend?

Mr. GOLDIN. The Clipper Graham.

Mr. ROHRABACHER. I'm very excited about that. I wanted to congratulate the folks at NASA. I think that Mr. Goldin has again demonstrated an activist approach to the American space technology that really is what we lacked.

We were sitting back relying on old technology and Mr. Goldin is moving forward to develop new technology which will make all the difference in the years ahead.

I've been working on that program for a long time, as you know, and what I'd like to first of all ask, considering the fact that the SSTO system is a dual use system and it basically is reinventing a government program, and it's a small program that only has a very small office, and it's creating high tech jobs, and basically what we're trying to do is create a transportation system that doesn't blow up and leave all sorts of things in space, you know, space debris, which makes an environmentally safe transportation system, plus it's saving the taxpayers money.

What I don't understand is why it has taken us so long to get to this point, and instead of throwing that to Mr. Goldin, I'd like to throw that to Mr. Davis. Because apparently, there was a two-year period when this program was started over at the Pentagon and people sort of wouldn't touch it because they thought it was a stepchild of the SDI program, and it took us two years of delay to get this thing on the road.

Mr. Davis, can you tell us why that happened?

Mr. DAVIS. Probably, sir, no good reason in particular.

[Laughter.]

Mr. DAVIS. Let me expand on that comment, though.

As you look at where the Department of Defense was in terms of the budget environment when the program started, there was a lot more money to go around for lots of things. And as a part of the downsizing the Department of Defense, 25 percent of it is in the process of disappearing because of the change in the world and the change in the threat and the assessment in those days.

In those days, in fact, there was an SDIO program, and they had much larger budgets than they do have now. In fact, we have a BMDO program now and the space segment no longer really is embedded in the BMDO side of it, it's back in the Air Force where it was originally.

What was the DCX at that point that you know many members, including you, pushed to do, and there were some pathfinding results of that.

It came to a conclusion and the Department of Defense made some simple decisions. One was what can we afford in this environment.

The second one was looking at the National Space Transportation Policy, which turned to NASA and tasked them to take the lead in RLV and the generation leapfrog technology.

And then turned to the Department of Defense and said you all are in charge of not simply surviving in the extendable launch technology but being aggressive in trying to improve what we had.

And so that's what we turned to do.

Mr. ROHRABACHER. Five years ago, everyone was saying this couldn't work, and now everybody's on board saying let's make it work.

And if indeed it does work, which I believe it will, the two years of delay that we had because of obstruction of people who wouldn't believe that it could possibly work, will mean that the amount of money that we're going to save with this program, I honestly believe it's going to dramatically bring down the cost of getting into space.

If we succeed in that, those two years will have cost the taxpayers enormous amounts of money as compared to relying only on the shuttle versus having the system which has actually cut the cost by maybe a factor of ten. But we'll see whether we succeed in bringing it down.

But with that, I'd like to ask one more question while I have time, and that is to our folks talking about the commercial launch. You know, I understand, I am a free trader, but it seems to me that our folks over at McDonnell Douglas who are not working on SSTO, who are working on other projects, the Atlas and the various other missiles that we have, and that would be McDonnell Douglas as well as others, you know, they can't build a system that's going to basically incinerate the local population when the rockets take off.

When the Chinese launch a rocket, every other time they kill lots of people.

Is it fair to say that our rockets have to compete, domestically built rockets with rockets built by the Chinese that murder people all the time when they take off?

I don't have any more time.

Mr. Dave WELDON. The gentleman's time has expired.

Mr. ROHRABACHER. I'll come back to that and let you answer that.

Mr. Dave WELDON. I'd like to recognize Mr. Luther.

Mr. LUTHER. Thank you, Mr. Chairman.

I certainly want to thank all of the panelists as well. I believe Mr. Eiss was attempting to respond to a question here just a few moments ago and ran out of time.

And I would be glad to yield my time so that he may respond.

Mr. EISS. Thank you.

Just to complete the point, the concern is that in saying no data provided, the impression that is left is that indeed either the data is not provided because we refused to provide it to you, or that the foreign government has refused to provide it to us, and indeed other than—the simple situation is that other than the situations where we have provided some actual analysis, they represent all of the competitions in which we have actually conducted all of the interagency as well as international consultations that would be necessary to in fact have the information.

In other words, we have identified, for example, in our China agreement, certain other, based on press reports, competitions that it is reported the Chinese are participating in, and we are in the process ourselves of reviewing interagency the information and attempting to establish from our own governmental sources, consulting with U.S. industry to determine exactly what their information is on this, and then based on that, potentially consulting with each of the countries.

So what I wanted to clarify is that, to be very clear on this—when one talks about pending competitions, competitions where there is in fact actual private sector jockeying for position and competition going on, there indeed, and as we've indicated, there indeed is information to why is this, because in fact they're still in the active commercial competition process.

So that's the main question that I wanted to correct in terms of the chart you've put up there.

We have provided you with the information on the analyses that we have conducted within the U.S. Government where those have been concluded.

What we also pointed out, and my testimony points out is that, as I mentioned, we did have, and we have had problems in our—in administering the first agreement with the Chinese under the pricing provisions of that agreement.

And those difficulties related to a number of things including the fact that the first agreement's provisions on what constituted par pricing was not adequately elaborated on in the agreement and it's been a very difficult issue and was a very difficult issue, one that we shared frustrations with U.S. industry and noted in our National Trade Estimates Report.

We therefore took the step in renegotiating the agreement of trying to rectify those problems in the new agreement and the fact is

that at this point, we do not have a track record to point to with respect to how the Chinese have performed under the new agreement.

Some of our preliminary information, from the press reports and otherwise, appears there's been some improvement, but we are neither sitting here today to endorse what the Chinese are doing today, nor condemn what they're doing here today because indeed there simply isn't a track record under the new agreement.

And we are prepared to let the provisions of the new agreement operate before we draw any prospective conclusions about how the Chinese are participating in the market today.

Thank you.

Mr. LUTHER. Thank you, Mr. Chairman.

Mr. Dave WELDON. I'd like to now recognize Mr. Foley.

Mr. FOLEY. Thank you, Mr. Chairman.

I'd like to thank you for your excellent leadership on this issue. And I would yield my five minutes available to you.

Mr. Dave WELDON. Thank you.

Well, I'd like to follow up on your comments, Mr. Eiss, in particular with regards to the chart. I have reviewed the trade agreements that the trade negotiators signed on behalf of the President, and those trade agreements read that those foreign countries shall provide the pricing data. It doesn't say that the Office of the Trade Negotiator will get the pricing data from industry. It doesn't say that it will come from press reports.

It specifically states, and it doesn't say that they may provide the pricing data, it says that they shall provide pricing data.

And what I asked for from your office, as part of this hearing process, was that information, and in particular I want that information on some of these other launches that I've listed there.

And you and your office made absolutely no data available to us. You indeed implied that in some of the cases, some of the information that is on the upper part of that chart—we may quibble about some of those percentages, but they're clearly outside of the range of what existed in the previous Bush Administration negotiated agreement.

There was very little data that any information had been provided by any of these non-market economies that are involved in these trade agreements.

And frankly, one of the questions that I was hoping to get an answer from you or Ms. Novelli in this hearing, is what are we going to do in the future to correct this situation where this Committee can be allowed to provide the proper oversight to make sure that the trade negotiator is signing agreements and then following up on those agreements?

As far as I can tell, the performance is dismal.

Ms. NOVELLI. Mr. Chairman, if I could respond?

As Don has said, under the original China agreement, which is what most of those China figures are, we recognized we had some trouble. We've amended that.

The Russia number that is up there was a product of intense consultation with the Russian government under the old Russian agreement.

Under the new agreement, we have regularized consultations which will be taking place. We expect to have them with all of these countries.

The new agreements with Russia were literally just signed a few months ago, and so we are going to be monitoring very closely what is going on. We have a whole procedure for doing that.

Part of our procedure is not to just accept at face value the information that's given to us by these governments but also to double check what we're doing with our industry, which involves the provision of confidential business information by them to us, so that we can make sure we have a complete picture.

So we do have a plan in place, we've attempted to implement it and we will be working with you and with our industry to make sure that these agreements are enforced and enforced vigorously.

Mr. Dave WELDON. Let me ask you a follow up to that, because I have about a minute and a half left here.

As I understand it, you have consultations scheduled with the Chinese in the near future. Is that correct?

Mr. EISS. That's correct, mid-July.

Mr. Dave WELDON. Have they provided you any information up until this point on the pricing of some of these launches that are pending?

Mr. EISS. No. At this point, they have not. Under the terms of the agreement, the information exchange in anticipation of the Act, the consultations occurs in the month or so before the meetings, and indeed we are meeting with, we're conducting our consultations with industry later this week to review the information that we'll want to be seeking from the Chinese.

Mr. Dave WELDON. And is any attempt going to be made in the future to provide the Committee with more detailed information that the trade agreements are being enforced by the Trade Negotiators' Office in the White House?

Mr. EISS. Well, again, Mr. Chairman, I think on that question, we have tried to, and have, I believe, provided you, over the course of the last few months, extensive information regarding the implementations of the pricing disciplines, the history of it.

We've shown what it has been and we've tried to explain that indeed, because of the way the agreements operated, we've made changes to the agreements themselves to rectify those problems.

Mr. Dave WELDON. Mr. Eiss, I'm sorry, but my time has expired.

I'd like to now recognize the gentlelady from California, Ms. Harman, for questioning.

Ms. HARMAN. Thank you, Mr. Chairman.

I'm very happy we're holding this hearing.

I heard most of the testimony and think that this first panel has made a very good effort to comply with the requests this Committee has made of it.

I think we have several goals, at least I do.

One is to be sure that we have a healthy U.S. satellite industry, and I know quite a bit about that industry since much of it is located in my congressional district.

The second is to make sure that we have a healthy U.S. launch industry.

Those are both goals. To get to health in both industries, we need to get the balance and I think the answers on what our best policy is require a balancing of interests.

So I was listening to you ask questions about the release of what I would consider, as a former corporate lawyer, to be confidential business information.

And thinking, gee, we need balance.

Let me expand on this.

Mr. Dave WELDON. Would the gentlelady yield just for a second?

The trade agreement that was signed calls for that information being provided.

Ms. HARMAN. I heard you say "shall." I understand, but what I'm thinking about, I'm not saying that there should be no information provided, I'm thinking about what information shall be provided, and how can that be provided consistent with the goal, one would think, of a healthy U.S. satellite industry and a healthy U.S. launch industry, and effective compliance with the commercial space satellite launch agreements.

I think that's the question that should be out there.

So my question of the panel is, do you agree with me that we need balance, and if we do, what are the best ways to achieve compliance, achieve, not change, but achieve compliance with the commercial space launch agreements so we get the information necessary out there so that again, what are we doing here, so that we can find out whether these foreign launch sites are somehow undercutting the ability of the U.S. launch industry to become healthy.

Mr. EISS. I guess, in order to properly implement the agreements, the main objective has to be to be able to continue to obtain the information we need in the Executive Branch in order to make comparisons and analyses necessary on which to make judgments.

Half of that information, or a portion of that information comes from the foreign governments in terms of their pricing in individual competitions in which they win the contracts.

I have to say to you that it is my experience with our China agreement that it has not been a difficulty of getting them to provide to us the prices and the contracts when they've won them.

The impression is that there is information that we have indeed sought from them that they are refusing to provide to us.

The reality is that other than the numbers we've shown here, those competitions are in a pending state or at a point where we're just going to have the consultations to get it. But that's only one part of the information.

The other part of the information, and perhaps more than that, is information we need to obtain with respect to western prices and the structure of the actual contracts.

That involves materials regarding the business proprietary activities of private U.S. companies. And I think in order for us to implement it, we must retain the confidence of the companies that the information we get to them will not inadvertently, to the detriment of their commercial competitions, enter the public domain.

Ms. HARMAN. Let me just say, I agree with that.

Mr. Chairman, I would guess that you do too. Because if we're going to have a healthy private sector, which is a goal here, U.S.

private sector, we have to respect the usual, I think the usual definitions of proprietary information.

And so we want information out there to make sure that these foreign launch sites are not undercutting U.S. industry, but on the other hand, we don't want to ruin the competitiveness, I don't think, of our U.S. satellite manufacturers, because that's another goal we have in mind.

Mr. Dave WELDON. The gentlelady's time has expired.

I'd like to recognize the Chairman of this Committee, Mr. Walker.

Mr. WALKER. Thank you, Mr. Chairman.

So many questions and so little time.

[Laughter.]

Mr. WALKER. Mr. Goldin, first of all, if you would, would you respond in writing to some questions that we have on the Voucher Demonstration Program?

Mr. GOLDIN. Sure. Yes.

Mr. WALKER. I want to take most of my time on the Ukrainian agreement that was signed, and I don't know whether it's Mr. Eiss or Ms. Novelli that can respond to this.

But can you tell me, as that contract was being negotiated and signed, did you consult with NASA?

Ms. NOVELLI. Absolutely. NASA was one of, we had an interagency committee and NASA was well-represented on that committee during the entire deliberations.

Mr. WALKER. So NASA was involved in the deliberations that led to the signing of the Ukrainian agreement?

Ms. NOVELLI. Absolutely.

Mr. WALKER. So the fact that we had no information on this Committee from NASA on these negotiations is that NASA was not keeping us informed, is that right?

I mean, I'm just trying to clarify here, you know, because we literally had no information during that period of time. It came as a total surprise to me when I received a call at home one night from the OSTP to tell me that this agreement had been signed, or was going to be signed the next day, and they just thought I should know about it.

It's the first time that we were informed about it in this Committee.

But NASA was involved in all these consultations?

That's what I wanted to clarify.

How about the commercial space offices at FAA and Commerce? Were they a part of this as well?

Ms. NOVELLI. Yes. Our whole interagency process, I would answer that we actually consulted with your Committee prior to the signing of the agreement, the Committee staff.

Mr. WALKER. How long before?

Ms. NOVELLI. I'm afraid I don't have the exact dates, but we can get those to you.

Mr. WALKER. I'm not aware that we had the information.

How about OSTP? Was OSTP involved in that process too?

Ms. NOVELLI. Yes, sir. It's a full interagency process.

Mr. WALKER. That I find kind of interesting because when I was called by OSTP that evening, I began to ask questions about it, and

they said well, they didn't know anything and couldn't give me any information because they had been left out of the loop.

There seems to be some confusion here because the whole series of questions I began asking, at that point, I said well, this was done without including us in the loop.

Ms. NOVELLI. Sir, do you mean the negotiation of the agreement or the actual signature by the President?

Mr. WALKER. I'm talking about the process that led to an agreement with the Ukraine.

Ms. NOVELLI. Well, as I said, we did have a number of communications with various people—I can get you dates on those—in the Congress, and there were numerous letters that were sent to us, including by members of this Committee, prior to the conclusion of the agreement about issues surrounding that agreement.

So, you know, I can't answer you about the specific agencies, but I can tell you that we can provide those letters to you that clearly show that quite a number of people were informed about the fact that there was a process of deliberation going on.

And I don't know about your issues with NASA or other agencies but there was a full interagency process and all agencies that are relevant to that process participated in the decisionmaking.

Mr. WALKER. The concern that we have is that most of us were kind of shocked by the nature of the agreement that was signed. Now there may well have been people who understood that there was a process underway here, and were asking questions about it.

But my question is on consultation. Who in the launch community recommended that the agreement that was eventually signed was in fact in the best interests of the United States?

Ms. NOVELLI. Who in the launch community?

Mr. WALKER. Yes. Who in the community that's concerned with the launch in this country in fact was, as a part of the process, endorsing that kind of agreement?

Ms. NOVELLI. Specific companies?

Mr. WALKER. Mostly within the agencies and within the Congress?

Ms. NOVELLI. As I said, we did consult with Congress about the fact that we were engaging in this process with respect to the interagency process. A consensus decision was reached as to how we would conclude this agreement with Ukraine. So there was a consensus, there was a government decision.

Mr. WALKER. So your testimony is that NASA, FAA, Commerce and OSTP all agreed to the final nature of the agreement, and you had their agreement in advance of actually signing?

Ms. NOVELLI. Yes, absolutely, sir. It was an interagency deliberative process. The final decisions were made by President Clinton personally and all agencies were involved in all of those decisions.

Mr. WALKER. Just so I'm clear now, in the process, all of them agreed that what you were signing was in the best national interest of the United States?

Ms. NOVELLI. It was a U.S. Government decision, fully cleared by all relevant agencies.

Mr. WALKER. And OSTP was fully involved in that process at that point?

Ms. NOVELLI. Yes, sir.

Mr. WALKER. Thank you.

Mr. Dave WELDON. I'd like to now recognize the ranking minority member of the Full Committee for questions.

Mr. BROWN. I apologize for missing most of your presentations. Therefore I cannot ask questions as well as I might otherwise.

But the conversation between Mr. Walker and the witnesses leads me to ask if there was industry consultation and, if so, did it include both the launch industry and the payload industry, the satellite people and so forth?

To what extent was there contact established between both of these American constituencies?

Ms. NOVELLI. Well, sir, there was extensive consultation with both aspects of the industry, both the satellite industry and the launch industry.

I will add that the majority of the people on both sides of the industry fully supported what the eventual result was on Ukraine.

We had a very unique situation with a U.S. company doing joint venture, so I think a lot of, most, the majority of people recognized that the benefits of the agreement rebound largely to the United States because of the way it was structured, but there was extensive conversation throughout the entire process.

Mr. BROWN. In my own contact with both parts of this industry, it's been my perception that the launch industry, generally speaking, doesn't want to lose any more launch business if it can, and the satellite industry wants to get the cheapest launch that they can.

Does that coincide with your general feelings?

Ms. NOVELLI. Actually, sir, what I would say is I think that there's been somewhat of a shift. I think that is partly true, but I also will tell you that the largest U.S. launch provider fully supported the Ukraine agreement because of the recognition that there is increasing globalization and that these kinds of agreements are actually beneficial to the competition, so it's not exactly a split now between the satellite industry and the launch providers per se any longer.

Mr. BROWN. It seems to me obvious that any decisions with regard to agreements of this sort have to include all phases of U.S. industry and to balance their interests. And it also has to consider the position of the foreign government and the degree to which their can be balance achieved there in terms of reciprocal benefits to both sides.

I assume that's the position that the U.S. Government took?

Ms. NOVELLI. Yes, sir.

Mr. BROWN. Does anyone else care to comment on this?

Mr. EISS. I'd also just point out, I think some recent developments in the market rapidly reinforces, I would go so far as to say that even for the satellite industry, the price, while an important consideration, getting their payload into orbit is equally important, and perhaps in light of developments in the last six to eight months, one that is taking on even greater significance.

So I think to me, some have tried to portray it as, if you will, a black and white interest between the launch companies and the satellite companies, and I think actually both parties are genuinely trying to wrestle with an issue and frankly maintain a relationship

or a healthy relationship they've each had with each other over a lot of years.

And so that balance is even more complex and further complicated by some of the developments in the market that Ms. Novelli has mentioned.

Mr. BROWN. You have no hesitation, both of you, or any others, to assert that the best interests of the United States' business community are served by these agreements?

Ms. NOVELLI. No, sir, none at all.

Mr. BROWN. Thank you.

Mr. Dave WELDON. I'd like to now recognize the gentlelady from California, Mrs. Seastrand.

Mrs. SEASTRAND. Thank you, Mr. Chairman.

Welcome to the panelists. Thank you for participating today.

I would ask unanimous consent for five additional legislative days to insert additional remarks.

Mr. Dave WELDON. Without objection.

Mrs. SEASTRAND. My question is for the entire panel.

Since we are allowing non-market economies access to the launch market, is there any reason why those launch vehicles should not be launched in the United States?

For example, the Ukraine will export Zenit launch vehicles to Boeing to launch from the South Pacific. Why not launch Protons from Vandenberg or the Cape or Alaska.

That's my question.

Mr. DAVIS. Since it looks like nobody's volunteering, ma'am, I'll volunteer since Vandenberg does belong to the Department of Defense.

Let me give you a short answer, and then a much longer answer with some caveats.

In and of itself, I'm not sure that it is bad national policy to have a foreign launch vehicle launched from a U.S. facility.

That's a fairly narrow statement, but there's an awful lot of caveats to that.

I think the right answer is balance, which was brought up before, is the right approach. The Department of Defense is in the national security business and one of the things we have to make absolutely sure of is that we have a robust launch economic base out there so that we can, if necessary, in the United States, reach out and touch launch houses that can get our payloads into orbit.

Also a major concern that I have is on cost recovery. At the moment, at Vandenberg, for example, that there is a commercial launcher likely at the Cape at the moment. The current formula is the right formula which says that we will only recover incremental costs. But that formula was generated at a time when the overwhelming number of payloads that were launched, or launch vehicles that went out, were U.S. Government launch vehicles.

That's no longer the case, and as there are more and more commercial launch vehicles, we have a question then of supporting the infrastructure.

And then there's a policy question of if we have a foreign launch vehicle launching from a U.S. base, do we amortize the basic business base, the infrastructure the Department of Defense has?

There's a billion dollars' worth of infrastructure that the Air Force alone owns and 5,000 people out there, and you give them days supporting the launch business, how do we recover those costs?

So it's a very complex question. I mean complex answer. The short answer is, in and of itself, I personally think the Department of Defense, there's no objection.

Having said that, there an awful lot of caveats that we have to address.

Ms. NOVELLI. I'd like to add also there is nothing in any of the agreements which preclude such an event from happening.

Mr. WALKER. Will the gentlelady yield?

Thank you for yielding.

I just wanted to follow up.

Mr. Goldin, would you provide the names of the people at NASA who were involved in the consultative process on the agreements?

Mr. GOLDIN. Yes, I will.

Mr. WALKER. Mr. Weaver, will you provide the names of the people at your office who were involved in that operation as well?

Mr. WEAVER. Yes, sir, I will.

Mr. WALKER. Thank you.

Mr. Dave WELDON. I'd now like to recognize the Ranking Minority Member of this Subcommittee, Mr. Hall.

Mr. HALL. Mr. Chairman, in light of the time, and we have a vote on, I'll submit my questions. I do have some questions about the mixed lead approach, but I'll go into those with a letter if I get consent to do so.

Mr. Dave WELDON. Without objection.

The Committee will adjourn for 15 minutes.

[Recess.]

Mr. Dave WELDON. It's getting late, we have another panel, and I'd like to wrap up with this panel so I can go ahead and dismiss you.

I'd just like to clarify a few items for the record and point out that the chart that I provided the Committee is based on data that was provided to me by USTR.

Also the 15 percent figure that we have talked about previously, I was always under the impression that that was a fairly hard and fast number. I'm a little concerned that that's now being interpreted as a rough guideline, and I think we're probably going to need to have follow up meetings on this between my staff and USTR.

But I would like to just direct a few questions to Mr. Weaver, if I could, before we bring forward the second panel.

Mr. Weaver, as I understand it, OCST has been in existence for twelve years, is that correct?

Mr. WEAVER. Since 1984.

Mr. Dave WELDON. What would you say is the primary mission of your office?

Mr. WEAVER. The primary mission of our office is the safety of the commercial space transportation industry, and to work with other agencies and the industry to help develop its international competitiveness.

Mr. Dave WELDON. That includes providing the regulatory framework for the industry so that they can engage in the on-going contract process and pricing process with customers?

Mr. WEAVER. That is correct.

Mr. Dave WELDON. As I understand it, you have some final regulations that your office will be issuing to the emerging spaceports to enable them to proceed?

We have several spaceports that are planning launches during the year.

Is that correct?

Mr. WEAVER. That is correct.

We are drafting those regulations. We have some that are drafted, especially ones that deal with launches from existing Federal ranges. We have drafted a proposed NPRM on financial responsibility. They are going through our review at the present time.

We have begun the drafting of commercial spaceport regulations. Very soon, we'll start working on reusable launch vehicle regulations.

Mr. Dave WELDON. When will you be making some of these drafts available to people in our spaceport industries to review?

Mr. WEAVER. The normal process would dictate that these regulations be provided for interagency and public comment. As soon as it clears the Department of Transportation, they will be made available for the industry to then review and comment, but I can't give you a specific date except to say that we hope very soon.

Mr. Dave WELDON. Mr. Weaver, the reason I'm pursuing this line of questioning is, in my particular state, we have potential commercial launches scheduled in less than a year. And the lack of regulations coming forward from your office is causing difficulties and problems for them in their planning, in their negotiations with payload customers.

And I believe there has been unnecessary delay in this on the part of your office. And I would like to see regulations coming forward within 90 days if possible.

I realize that you have to get a lot of interagency review, but nonetheless to have your office in existence for 12 years and no regulations coming forward I think is unacceptable.

I would like to see some regulations coming forward within the time period that was specified.

Mr. WEAVER. If I may, I would just like to add a little bit of clarification.

We currently do have the statutory authority to regulate not only just launch vehicles but launch sites. And since August of 1994, even without regulations, we have provided guidelines, a copy of which I have here.

This is the most recent edition, dated August of '95, which updated the August '94 guidelines. These have been made available to spaceport operators.

We would welcome and we are ready to begin right now working with them to get them licensed by the time that they have indicated to us they intend to begin operations.

Concurrently, we will be working to ensure that we update the regulations to ensure that minimal federal safety standard at all

launch sites, and we will do our very best to try to meet the goals and objectives of the industries and Congress.

Mr. Dave WELDON. I'd like to yield the remainder of my time to Mr. Walker.

Mr. WALKER. I thank the gentleman.

I just want to clarify a couple of things too for the record, and we'll have to follow up on some of this.

It is my understanding that the Science Committee's staff requested a meeting with USTR on the Ukrainian agreement after there was a press leak about the agreement being pending.

At that point, a meeting was asked for. The agreement was then initialled and it was not until December 6th that we actually got such a meeting. That was the first time that we were even aware of this is when the press reported it.

Also, USTR refused to provide a copy of the agreement in advance of the initialling so that we could understand what was going on.

It's my understanding, Mr. Chairman, that you wrote a letter to USTR on the 15th of November, prior to the initialling of the agreement.

Mr. Dave WELDON. That is correct.

Mr. WALKER. And received no response to that. As a matter of fact, it was almost two months later that it was finally responded to, only because your staff followed up.

And so my concern is that the consultation that we were told is taking place just didn't happen.

And just one point of clarification. I've asked the agencies to provide me with the names of the people from their agencies.

Would USTR also provide me with the names of all of the people from all of the agencies that were a part of the interagency process?

Ms. NOVELLI. Yes, sir, to the extent we have all those records, we'll be glad to. We'll also be glad to provide you with dates of consultations, phone calls, etcetera, letters incoming and responses.

Mr. WALKER. That would be very helpful. Thank you.

Mr. Dave WELDON. I'd like to recognize the gentleman from Kansas, Mr. Tiahrt.

Mr. TIAHRT. Thank you, Mr. Chairman.

Ms. Novelli, I would have asked this question to Mr. Goldin before, however, I didn't know that NASA was involved in the decision or had approved of this agreement with Russia and the Ukraine.

I assume Mr. Davis was also not in his position at the time the agreement was made.

But I did send a letter to the White House addressing my concerns about the agreement, and that was spurred by the report that came out of two articles that I'm going to submit for the record.

The first report says basically that we have an agreement now that allows Russia to export converted SS25 ICBMs, known as the START launch vehicles.

The second article was published the following day which is "White House Denies Any Concessions To Russian START Provisions," but this says basically that there was a Government White

Paper that concluded that this would lead to ICBM proliferation within five years.

So in my letter that I wrote, I was concerned, and it was signed by quite a few members of this Committee between Mr. Weldon, Mr. Funderburk, Mr. Wamp and Mr. Jones, Dr. Hastings, Mr. Lewis, myself, and Ms. Seastrand.

We're concerned that this would allow Russia to continue to produce ICBMs and export them for launch and allow them to evade arms reduction, and it's going to make more readily available components for intercontinental ballistic missiles.

So I guess my question really goes to Mr. Davis.

Do you think that this will lead to the proliferation of ICBMs in not just the third world, but worldwide?

Mr. DAVIS. Sir, that is a consideration of the Department of Defense.

In terms of the process, the Department of Defense did participate in the interagency process and I very clearly remember—nothing focuses your attention like a deadline—and I can remember, I want to say like on a Wednesday or a Thursday morning, getting notice that essentially decision time was coming. And we had a series of meetings in DOD to confirm what our position was.

Then there was a meeting where we participated, so our views were known in the process.

In and of itself, the level of the volume of the use of what would have been ICBMs, or people working in factories or the technology is of some concern. It's not a critical concern at this point.

Mr. TIAHRT. Yes or no? Is there going to be some increased proliferation?

Mr. DAVIS. Strictly because of this agreement, no, sir. I would not say that that would be the case.

Mr. TIAHRT. You don't think this is going to allow Russia to go to third world locations and set up launch sites that these things that will be for sale to third world countries? You don't think there's going to be any proliferation of ICBMs?

Mr. DAVIS. We're concerned and will continue to be concerned about proliferation of ICBM technologies and people. Strictly in the context of this specific agreement, we found that acceptable.

But we have the flip side to worry about too, in being a role model for the world in terms of refurbishing Minuteman IIs. We have to be careful what we do in the Department of Defense.

Anything we do, you know other countries in the world will assume that is at least what they can get away with.

Mr. TIAHRT. That was the second part of my question. I guess recently we've approved of allowing five Minuteman missiles to be updated for this purpose or converted for this purpose in this agreement, which is purely based on cost as far as competition.

We have a problem with—not only our space industry. How can they compete with countries that are subsidized more heavily than we are? What is the real cost of selling a launch vehicle and putting something in orbit?

Mr. Weaver, you say you have control over these launch vehicles and launch sites.

Were you consulted on whether there was any environmental impact in this agreement or whether there was any worker safety im-

pact in this agreement, or is this just purely a cost-only one-dimensional agreement?

Mr. WEAVER. Yes, we were concerned about the Ukrainian agreement. In the Ukrainian agreement, it does require a DOT license to be issued. And during that licensing review process, the environmental consequences, as well as a review of all of the U.S. Government treaty policies will be reviewed as a part of the review initiative.

Mr. TIAHRT. Binding on both parties, or is that unilateral?

Mr. WEAVER. Binding on both parties, you mean the agreement?

Mr. TIAHRT. Yes.

Mr. WEAVER. Yes.

Mr. TIAHRT. So the Ukraine has to get approval for environmental impact statements?

Mr. WEAVER. It would be the launch operator that we license.

Mr. TIAHRT. The launch operator. So whoever would procure the SS25?

Mr. WEAVER. In this case, we're talking about the Zenit rocket in the Ukraine.

Mr. TIAHRT. I'm sorry, you're correct.

Is there any consideration for worker safety in your evaluation, or is it just primarily——

Mr. Dave WELDON. The gentleman's time has expired.

Mr. WEAVER. All those things are important.

Mr. TIAHRT. My concern is, in conclusion, if I may, Mr. Chairman, is that we have a space launch commercial industry out there that may have some small benefits for one or two contracts now. Long term how are we going to have fair and reasonable competition? That's what I'm concerned about.

The second is I do view this as leading to the proliferation of ICBMs. I'm very concerned about that.

If you have read Tom Clancy's last book, Debt of Honor, which is fictitious of course, but it does make a point that they could be used.

I think our nation and our requirement to defend this nation, you should be very concerned about, Mr. Davis.

Thank you.

Mr. Dave WELDON. I'd like to thank this panel for their participation.

Mr. DAVIS. Excuse me, Mr. Chairman. Could I add just one thing. I'm not going to ask any questions but I'm just going to say on this issue that Mr. Goldin was good enough to go through, you might talk to some of the commercial users on that.

We had a very good meeting and I appreciate the work he's doing for Robert Davis, who was my next door neighbor for many years, when I was a county supervisor and he worked on the Hill. I can't think of a finer person having this position. Congratulations; I don't know if it's a promotion or not move to the Executive Branch, but it's good to see you keeping up the good work. Thank you.

Mr. Dave WELDON. Thank you, gentlemen. There may be additional questions coming to you in writing, and I very much appreciate your participation on the panel.

I would like to call up the second panel to testify now. I recognize industry witnesses.

We have Dr. Brian Dailey, Vice President of Business Development for Space & Strategic Missiles Sector for the Lockheed Martin Corporation.

Mr. Stanley Ebner, Senior Vice President, McDonnell Douglas.

Mr. David Montanaro, Vice President, Strategic Relations of Teledesic.

Mr. Ed O'Connor, Executive Director of Spaceport Florida Authority.

Mr. Pat Ladner, Executive Director, Alaska Aerospace Development Corporation.

And finally we have Mr. Donald D. Smith, Executive Director of Western Commercial Space Center.

We'll give you all a minute to get set up here.

[Pause.]

Mr. Dave WELDON. I'd like to go ahead and begin with Dr. Brian Dailey.

STATEMENT OF DR. BRIAN DAILEY, VICE PRESIDENT, BUSINESS DEVELOPMENT FOR SPACE & STRATEGIC MISSILES SECTOR, LOCKHEED MARTIN CORPORATION

Mr. DAILEY. Thank you, Chairman Weldon.

On behalf of Lockheed Martin Corporation, I would like to thank Chairmen Walker and Sensenbrenner for this opportunity to address space launch issues. These are issues of critical importance to us who are concerned about American space leadership, and they are certainly important to Lockheed Martin.

Lockheed Martin's fleet of launch vehicles addresses more than 80 percent of the world market from the smallest to the largest launch vehicles.

I would note at the outset, Mr. Chairman, that we might prefer a world in which our foreign launch competitors all go away and domestically we continue to depend upon the U.S. Government for answers to all our problems.

But the real world presents us instead with a familiar mix of opportunities and challenges, something that demands much more of us as problem solvers.

As to this business, it's the subject of intense competition among an increasing number of domestic and international launch suppliers.

Lockheed Martin has responded aggressively to this competition by focusing on measures that will continue to improve performance of our launch systems and lower our costs, precisely those things that in the past we and others have sought to achieve through a major development effort.

And that, Mr. Chairman, brings us to our second challenge. Historically, the United States, as well as every other government desiring a national or regional launch capability has had to shoulder most or all of the financial responsibility for development costs.

With the current budgetary environment, it has caused both government and industry to seek out, and in the case of Lockheed Martin, actually to implement alternative approaches to managing and sharing the financial burden of launch technology development.

We've invested over $700 million in the past and plan to invest some $300 million in the near term with an additional $200 million from our partners.

Our development of the small launch vehicle capability of the Lockheed Martin launch vehicle was financed entirely by private capital, and is not included in the investment numbers I stated above.

The magnitude and scope of these investments by Lockheed Martin, particularly with respect to the Atlas system, are probably unparalleled in the annals of launch development initiatives.

The current environment of shrinking defense and civil space budgets also makes it difficult to continue pursuing purely national go-it-alone space transportation strategies.

Lockheed Martin has been a pioneer in exploring options for mutually beneficial cooperation with foreign launch entities.

Prominent among these is our complementary marketing of the Atlas vehicle with the Russian built Proton to International Launch Services.

In short, we are mapping an aggressive challenge to the European hold on 60 percent or so of the global market today.

Mr. Chairman, we certainly understand that we cannot depend upon the government market to the extent that we once did, which is why we view the growth of the commercial launch business as such an important area in the future.

But in Lockheed Martin's view, the unqualified reliance on U.S. launch industry to meet the government mission needs to be continued to be an essential tenet of U.S. policy.

The problems with the U.S. Government's continued reliance on quotas are manifold, though.

First, given the number of suppliers currently active in the market, this approach is probably, from a practical standpoint, unmanageable.

Second, at a time of robust activity in the satellite market, much of what is led by U.S. companies, some 70 percent quotas constrain access to the supply of the much needed launch vehicle capability, a need, Mr. Chairman, that is increasingly exacerbated by the two recent failures, one of Ariane 5 and Long March 3B.

Finally, the current quota system only applies to certain suppliers and relatively marginal ones at that.

Meanwhile, the European launch supplier operates at capacity, marketing more vehicles commercially than any other supplier with no U.S. imposed trade constraints whatsoever.

Moreover, it is fair to say that this supplier is the world's most heavily-subsidized and has freely pursued its long-standing strategic goal of securing at least 50 percent of the world market, a goal that is exceeded by 10 to 15 percent in any given year.

The Ariane program illustrates vividly how some governments go far beyond support for development as it is understood in the U.S. Direct European financial support for commercial Ariane objects are in the $5-7 billion range officially, and unofficially as high as $10 billion.

If the past practice is any guide, this support will be provided on an on-going, open-ended basis, representing investments that will never have to be amortized over the sales to commercial customers.

In short, Mr. Chairman, if damage to U.S. interests is measured by lost business, it would seem that our trade efforts in this area have been focused on the wrong player.

Lockheed Martin's position on launch trade policy was articulated——

Mr. Dave WELDON. If you could summarize your comments. I'm enjoying your comments, by the way.

Mr. DAILEY. In closing, Mr. Chairman, in meeting these needs in today's budgetary environment it is challenging. We at Lockheed Martin intend to ensure that the U.S. has a cost effective robust launch vehicle family capable of competing successfully in the post-2000 global launch services market.

We are in the market to stay and we will put forward whatever resources are necessary to maintain our launch leadership position.

Thank you for the opportunity to testify, and we look forward to questions.

[The prepared statement of Mr. Dailey follows:]

TESTIMONY OF BRIAN D. DAILEY

VICE PRESIDENT, BUSINESS DEVELOPMENT

SPACE AND STRATEGIC MISSILES SECTOR

LOCKHEED MARTIN CORPORATION

Before the

COMMITTEE ON SCIENCE

US HOUSE OF REPRESENTATIVES

On

US SPACE LAUNCH STRATEGY

June 12, 1996

Introduction

On behalf of the Lockheed Martin Corporation, I would like to thank you, Chairman Walker, for the invitation to appear before the Committee today and for the opportunity to address space launch issues. These are issues of critical importance to those of us who are concerned about America's space leadership. Given the company's broad interests in this area, it is certainly an important subject for Lockheed Martin.

Lockheed Martin is a major spacecraft manufacturer, having built over 600 satellite systems for government and commercial customers - a unique industry achievement. Our government work has involved important contributions to the nation's civilian and national security programs. Indeed, we have been involved in providing spacecraft or instruments to NASA for every planetary mission that this nation has flown.

In the commercial arena, Lockheed Martin is one of the world's leading suppliers of three-axis stabilized communications satellites, we are building the satellite buses for the IRIDIUM® worldwide mobile telecommunications system, and we are producing a one-meter earth imaging satellite system for our own Space Imaging venture. Lockheed Martin also intends to be a major provider of innovative broadband satellite services through our Astrolink™ system, a project that will help transform the vision of a global information highway into reality.

The Lockheed Martin fleet of launch vehicles addresses more than 80% of the world market from the small end converted Minuteman assets to the heavy-lift Titan IV. The Lockheed Martin Launch Vehicle (LMLV) family is the newest addition, developed entirely through private financing to serve the growing market for small payload launches. Our Titan II and MSLS (Minuteman) programs, complementing the upper and lower end of the LMLV capability, provide refurbished ICBMs for government test and small payload launch missions. Our Atlas family is a mainstay space transportation system that covers the heart of the commercial market - payloads up to 8,150 pounds to GTO and 19,050 to LEO - and provides intermediate launch capability to support government payloads. Proton, manufactured by the Khrunichev enterprise in Russia, offers commercial medium-to-heavy-lift capability, including multiple payloads on a single launcher. It is marketed, along with Atlas, by International Launch Services (ILS), which is jointly owned by Lockheed Martin, Khrunichev, and Energia. Titan IV is the heavy-lift launch vehicle for US Government payloads. The newest model, Titan IV B, includes new solid rocket motors, new avionics, standard payload interface adapters, and a number of other features designed to reduce launch costs and improve operability. This version is scheduled to launch the Cassini mission to Saturn next year.

Based on this broad range of space interests, Lockheed Martin has a major stake in the issues that the Committee has raised and seeks to address in this hearing. Indeed, we too have wrestled with these issues and sought to devise a strategy that would harmonize potential internal conflicts among our different business lines in a way that makes the most sense in light of today's political and economic realities. I would note at the outset, Mr. Chairman, that we might prefer a world in which our foreign launch competitors all go away and, domestically, we continue to depend on the US government for the answers to all our problems. But the real world presents us instead with the more familiar mix of opportunities and challenges, a prospect that demands more of us as problem-solvers.

Our primary opportunity is derived from current market forecasts, which project a need for 20 to 32 commercial launches per year, if not more, through the end of this decade and into

the next. This trend reflects the robust growth of space-based telecommunications and information systems. The corresponding challenges are two-fold.

First, this potential business opportunity is the subject of intense competition among an increasing number of domestic and international suppliers. In addition to the Europeans, McDonnell Douglas has announced its intention to enter the intermediate market segment with their reported investment plans for development of the Delta III. At the heavy-lift end, we have the introduction of China's Long March 3B, Boeing's Sea Launch venture, and the Ariane 5, whose first flight setback represents only a temporary postponement of its market entry.

Lockheed Martin has responded aggressively to this competition - that is what the commercial world is all about, after all - but there are some other issues to be addressed in devising strategies for doing so. And that, Mr. Chairman, brings us to our second challenge. With decreasing defense and civil space budgets, the government cannot be counted on as the sole customer that it once was. Nor can industry continue to look to government to shoulder the entire burden of non-recurring investment in technological development or infrastructure.

In light of these realities, success in achieving our objectives as a nation is highly dependent on the collective ability of both government and industry to adapt traditional core strengths to the current environment, and to make the necessary adjustments in how we have historically approached both launch technology development and trade policy.

Launch Technology Development

Although many of the economic and political externalities affecting US space activity have changed over the past decade, basic US space transportation needs have remained largely the same: the nation still needs to have the capability to meet the full range of government mission requirements in all weight classes, particularly for national security purposes, as well as the capability to maintain a strong commercial stance in the global commercial launch market. Meeting these needs in today's budgetary environment has, however, become difficult. In particular, achieving the cost reductions and improved performance that only a significant development initiative will yield, has become a daunting challenge.

That development costs for space launch technology are high is, of course, nothing new. Nor is the fact that the size of the launch market is not large enough to support the sort of industry-driven investment typical to, say, the civil aircraft industry. Thus, historically, the US government as well as every other government desiring a national or regional launch capability has had to shoulder most or all of the financial costs of its development.

But current US budgetary environment has caused both government and industry to seek out - and, in the case of Lockheed Martin and its heritage companies, actually to implement - alternative approaches to managing and sharing the financial burden and business risk of launch technology development. As an example, today's commercial Atlas was the beneficiary of some $700 million in private investment to realize performance upgrades, infrastructure improvements, and new vehicle purchases. More recently, as part of its launch vehicle modernization plan, Lockheed Martin is investing over $300 million - and our teammates an additional $200 million - to develop the new Atlas IIAR, a common core booster, and to continue improvements to launch services provided by the existing fleet of launch vehicles that the company manufactures. As with our approach to future satellite design and reproduction, we are utilizing common components and manufacturing processes to the greatest extent possible within our launch vehicle family and related launch infrastructure. The Lockheed Martin Launch Vehicle was financed entirely by private capital, and our Skunkworks organization is fielding the VentureStar™ reusable vehicle in

response to NASA's government-industry partnership initiative to develop the nation's next-generation launch system. The magnitude and scope of these investments by private entities, particularly with respect to the Atlas system, are probably unparalleled in the annals of launch development initiatives.

In addition to shifting the traditional financial risks, the current environment of shrinking defense and civil space budgets makes it difficult to continue pursuing purely national, "go-it-alone" space transportation strategies. Thus, industry and government have also been exploring mutually beneficial cooperative relationships with foreign space organizations. The International Space Station is the most visible example of this phenomenon at the government-to-government level. In the private sector, Lockheed Martin has been a pioneer in exploring options for mutually beneficial cooperation with foreign launch entities. Prominent among these is our complementary marketing of the Atlas vehicle with the Russian-built Proton, through which we are mounting an aggressive challenge to the European hold on 60% or so of the global market. More forward-leaning still, is our intention to integrate the Russian RD-180 engine into our plans for the Atlas IIAR and a US-manufactured RD-180 for the Evolved Expendable Launch Vehicle (EELV). Our objectives for each of these two related launch programs are essentially the same: to enhance performance, streamline operations, provide highest reliability, and achieve substantial reductions in cost for our government and commercial customers. To accomplish these objectives, a reliable new propulsion system was required - and the best candidate was the proven Russian RD-180 engine. To address the government's need for a stable and predictable source of launch vehicles for its national security missions, we have initiated the transition to US production of RD-180 engines.

Although industry is investing private capital and looking abroad for ways to reduce the government's financial burden, this demonstrated willingness to deviate from the traditional approach to financing launch development costs would be very difficult if not impossible to sustain unless the foundation of this approach - i.e., industry's historical core government customer base - remains intact. Mr. Chairman, we certainly understand that we cannot depend upon the government market to the extent that we once did, which is why we view the growth of our commercial launch business as so important to our future. But, in Lockheed Martin's view, unqualified reliance on the US launch industry to meet government mission needs must continue to be the central tenet of US launch policy.

Moreover, while endorsing existing policy on judicious use of foreign technology to improve US launch systems, we urge the US Government to maintain the prohibition on use of foreign launch systems, including converted foreign excess ballistic missile assets, to launch government payloads. Lastly, in recognition of industry's assumption of greater financial risk in technology development and the need to be increasingly more responsive to commercial customers, policies encouraging agencies to factor the launch industry's commercial requirements into its development strategies must be fully implemented.

Launch Trade Policy

At Lockheed Martin, we are committed to maintaining a strong US presence in the international launch market. But to remain competitive, we must be able to offer government and commercial customers alike improved performance and lower costs and, as noted above, we are already taking steps through investment and cooperation to do so.

That said, friction will inevitably arise out of competition between US companies and foreign launch competitors operating with the benefit of very different government support structures. Finding the most appropriate way to deal with this issue has not been easy for US industry or government policy-makers. But while Lockheed Martin and others are

departing from traditional formulas in order to address the current realities of the launch business, US trade policy in this area remains virtually synonymous with one word: quotas.

The problems with the US government's continued reliance on quotas are manifold. First, given the number of suppliers currently active in the market, this approach is probably, from a practical standpoint, unmanageable. Second, at a time of robust activity in the satellite market, much of it led by US companies, quotas constrain access to the supply of much-needed launch capacity. The respective failures recently of the Long March 3B and Ariane 5 can only aggravate the adverse impact of a quota-based policy. Finally, the current quota system only applies to certain suppliers, and relatively marginal ones at that.

Meanwhile, the heavily-subsidized European launch supplier operates at capacity, marketing more vehicles commercially than any other supplier, with no US-imposed trade constraints whatsoever. Moreover, it is fair to say that this supplier is the world's most heavily-subsidized and has freely pursued its long-standing strategic goal of securing at least 50% of the market, a goal that has been exceeded by 10-15% in any given year.

The Ariane program illustrates vividly how some governments go far beyond support for "development" as it is understood in the US: direct European financial support for commercial Ariane objectives are in the $5-7 billion range officially - and unofficially as high as $10 billion. If past practice is any guide, this support will be provided on an on-going, open-ended basis, representing investments that never have to be amortized over sales to commercial customers. In short, Mr. Chairman, if damage to US interests is measured by lost business, it would seem that we have been focused on the wrong player.

The Lockheed Martin position on launch trade policy was articulated in a letter from our Chairman, Dan Tellep, to Vice President Gore last year at this time. First, we do support maintenance of an overall trade framework. But the long-term approach that we have suggested to the government is one that relies far less over time on quotas and focuses more on unreasonably low pricing and other unfair trade practices, especially in cases where there is demonstrable harm to US interests (i.e., a "harm test"). Second, we believe that this framework must be a comprehensive one that covers *all* active competitors in the world launch market, specifically including the Europeans.

FAA/Commercial Space Transportation

Mr. Chairman, you have also asked for our views on the Department of Transportation's commercial space transportation office, which was recently relocated to the Federal Aviation Administration. Various elements of Lockheed Martin, and our heritage companies, have worked with this organization over the course of many years. Since it was established in 1984, originally as part of the office of the Secretary of Transportation, the office has played a role in virtually all of the important issues affecting the industry, including the formulation of post-*Challenger* policies pertaining to the use of the Space Shuttle and the allocation of risk arising from commercial launch activity.

We believe that, more than 10 years after the office was established, it would be useful for the office to refine its mission and, in particular, ensure that its resources are directed toward priorities that reflect developments in the launch and satellite industries. This is similar to what we in industry are doing and would ensure the most "value-added" role for the office in that enterprise to which we are all committed: US launch leadership. We would be happy to assist that effort in any manner that would be useful and appropriate.

Conclusion

Mr. Chairman, the relationship between the two issues that we are addressing today - trade and technology development - is extremely important. In announcing the newly-revised Russian agreement earlier this year, the US government again referred to all of the current agreements (i.e., China, Ukraine, and Russia) as "transitional." This idea of a "transition" refers not just to their movement towards more genuinely market-oriented competition in the international market, a concept that has been at the core of launch trade policy since 1988. What has often been obscured in the launch trade debates is the fact that these agreements were also supposed to give *us* time to accomplish our own transition - i.e., to get our post-*Challenger* house in order. This has, unfortunately, been a long time happening and it is certainly arguable that we, as a nation, could be doing much more to advance that transition.

However, at Lockheed Martin, we believe that we are attempting to do what quotas have not done and cannot do: provide the US with a cost-effective, robust launch vehicle family, capable of competing successfully in the post-2000 global launch services market.

Our success in executing a corporate business strategy featuring targeted investment, rigorous market analysis, technology infusion, and strategic alliances, will help assure access to space for all payload types, from the smallest to the largest, and from student-research projects to our most critical national security assets. With your support, this access can be sustained and enhanced within the budgetary and political constraints of the coming years.

Mr. Dave WELDON. Your entire statement will appear in the record.

Mr. Ebner, if you can proceed now, please.

STATEMENT OF MR. STANLEY EBNER, SENIOR VICE PRESIDENT, MCDONNELL DOUGLAS

Mr. EBNER. Thank you, Mr. Chairman.

I, too, would like to submit my statement for the record.

I'm not going to read anything from the statement, but make a few comments that just merely amplify what's already been said here, including our expression of the Company's appreciation for your having this series of hearings.

We think the subject is a highly important one. It probably hasn't received the attention, until now, that it ought to.

We've been in this business for a long time with the Delta program for some 35 years. We've got a fairly clean and uncomplex situation. We are in the space launch business. We don't build satellites. All we are in the business of doing is trying to put payloads into the air.

And all we care about is that we have an opportunity to do that in a fair and competitive situation.

We understand competition at McDonnell Douglas. We're in it all the time, just as Lockheed Martin and other major companies are. We compete internationally with manufacturers of fighter aircraft and missiles and helicopters, and that's fine. And we understand that the rules vary from time to time.

But what we are concerned about and remain concerned about is U.S. policy which I'd have to say, in this case, that is the case dealing with the agreements with the Ukraine and China and Russia, seems to be driven more by foreign policy considerations than considerations of the space launch industry.

We feel that we make up a significant part of an industry that is a national asset, that it needs to be allowed to develop with U.S. technology in an environment that provides for fair competitive situations, and we just don't have that when we compete with a launch vehicle from China, the Ukraine, or Russia, because they are non-market economies as has already been discussed here. I think everybody understands what that means.

Therefore, we are quite concerned when rules that we thought we understood when we began to develop our Delta III program or made the decision to go ahead with Delta III, had been changed fairly drastically so that quotas and limitations have been more than doubled.

And it's fair to say that in any situation where we are going to be competing head to head with a launch vehicle from one of these non-market economies, it's going to be very difficult for us to win.

We have the very fortunate situation that we are kicking off the Delta III program with a commitment from Hughes of ten launches and we're very pleased at that.

But of course we can't continue the Delta III program based on that alone. We have to be able to get a certain number of future launches and the ability to get those is predicated on what we thought was fairly stable U.S. policy and agreements with Russia and China that we thought we understood.

And, of course, that has been radically changed. We are now concerned about the risk in the future for our program, and that's the environment which we find.

The statement that I'm submitting amplifies the rest of that.

And I appreciate the opportunity to make the comments that I've made up to now.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Ebner follows:]

TESTIMONY OF STANLEY EBNER

SENIOR VICE PRESIDENT,

WASHINGTON OPERATIONS

McDONNELL DOUGLAS CORPORATION

before the

SPACE AND AERONAUTICS SUBCOMMITTEE

U.S. HOUSE OF REPRESENTATIVES

JUNE 12, 1996

Mr. Chairman, Members of the Subcommittee:

My name is Stanley Ebner, and I am a Senior Vice President of the McDonnell Douglas Corporation. On behalf of McDonnell Douglas , I thank the Chairman and other members of the Committee for their interest in this important issue, and for holding this hearing.

As everyone involved with space launch understands, the commercial launch services business is in a very dynamic period. Notwithstanding this uncertain environment, our company is committed to a commercially viable, single-stage-to-orbit reusable launch vehicle. We feel we are making significant progress toward that goal. Successful investments today will enable future successful investments including the reusable launch vehicle (RLV).

Achieving a reusable launch vehicle will assure American leadership in space. Getting to tomorrow's reusable launch vehicle is another matter. To achieve that goal, we must remain competitive today in space launch. I am concerned that current policies may endanger our ability to do so.

On the demand side of the equation, new space-based telecommunications systems are proposed on a regular basis for low earth orbit (LEO), medium earth orbit (MEO), and geosynchronous (GEO) orbit.

On the supply side of the equation, in the relatively short time frame of the decade since the Challenger disaster, we have gone from an industry of only two suppliers--NASA and Ariane--each of which was government funded and controlled, to the current industry of six international suppliers--China, International Launch Service (includes Proton and Atlas), Boeing Sea Launch, Ukraine, Ariane, and McDonnell Douglas. Others like the Japanese may be on the way to joining this group.

Although the U.S. government is now essentially out of the commercial communications satellite launch services business, this is an industry which continues to be dominated by government-funded entities. McDonnell Douglas is the only provider not linked to or subsidized by a government entity. It also

occupies a unique position in international commerce. There are few, if any, other industries in which non-market economy suppliers have so quickly become such a significant factor.

As has long been recognized in U.S. trade law, non-market economy suppliers bring their own particular set of issues to the international commercial marketplace. In the launch services industry, they have brought capacity, formidable technology and a pricing flexibility which is not found in publicly-held companies, like McDonnell Douglas, operating in a market economy. Non-market economy suppliers are not constrained by real costs and have a seemingly unlimited ability to offer lower prices to get market share. Our experience indicates they have done just that.

At McDonnell Douglas, we recognize the changing face both of the market and its competitors. Our Delta II vehicle, with its demonstrated record of success, remains capable of providing a wide variety of launch services. However, with the increased size and weight of commercial satellites and intense price competition, we began to see that satellite owners/operators were demanding enhanced performance capacity and lower cost to orbit. In a nutshell, we had to decide whether to invest hundreds of millions of dollars of company funds necessary to develop a new vehicle capable of meeting stringent performance and cost criteria.

As you would expect, we made exhaustive market assessments, fully understanding that we are in a very dynamic environment. We examined the potential market supply, and thoroughly and carefully considered those policies of the U.S. government which we believed would have an impact on our business decisions and our ultimate commercial success.

As a material part of this evaluation, we made certain assumptions based on the National Space Transportation Policy, issued August 1994, and the conditions set forth in the trade agreements which were then in effect with the People's Republic of China and with Russia. We concluded that, within certain parameters, we could succeed commercially building a new vehicle, which would increase our capacity to Geosynchronous Transfer Orbit (GTO) from

about 4,000 pounds to about 8,400 pounds and would significantly lower our cost to orbit on a dollar per pound basis.

As we do in our commercial aircraft business, we planned to begin development of a new launch vehicle as soon as we had an acceptable level of initial orders. We were pleased when in March of 1995, Hughes Aircraft Company placed the initial order for ten of our new vehicle, the Delta III, with options (one of which has been exercised) for a sizable number of additional vehicles. Launches of these vehicles will occur between 1998 and 2002. With this contract in hand, and believing that we understood the market parameters bounded by government policy, McDonnell Douglas made the decision to proceed with the development of the Delta III.

While we are enormously pleased to have entered into this relationship with Hughes, it is not of a magnitude which will, by itself, achieve the business objectives of the Delta III program. We must have substantial additional commercial sales to meet these objectives. Delta III was designed to address the needs of the international commercial market and our decision to proceed was based on assumptions made with respect to that market. We did not and do not anticipate a substantial military or civilian government market for Delta III. This is a commercially developed launch vehicle for commercial use.

The facts on which we made our assumptions with respect to the international commercial market have changed substantially. While we anticipated and understood that there would be some uncertainty with respect to the demand for satellite launch services, we did not anticipate that changes in U.S. government policy would so radically and rapidly change the available supply of such services. As of March 1995--when we announced the Delta III--the U.S. had trade agreements with Russia and China which permitted launch suppliers in those countries to launch a total of 29 commercial satellites through the year 2001. As of January 1996--just 10 months later--this number has more than doubled as a result of the new agreement with the Ukraine and the renegotiation of the Russian agreement. Frankly, we believe that this poses a significant and unanticipated risk to our investment in the Delta III program.

It is not only McDonnell Douglas' investment in the Delta III which is now at greater risk. We also rely on a substantial number of suppliers and subcontractors to provide key elements of our launch vehicles. Each Delta III vehicle will require in excess of 1600 person years of direct labor. Indirect labor requirements are probably twice that. High wage/high tech manufacturing jobs are at stake in a number of states. Many of our suppliers and industry colleagues, including Alliant Techsystems, I.T.T. Defense and Electronics, Allied Signal Aerospace, Thiokol Corporation, Rocketdyne Division/ Rockwell International Corporation, and GenCorp Aerojet--have expressed their concerns in recent letters to the President.

McDonnell Douglas and its suppliers have never sought to exclude non-market suppliers from the market. We simply ask that the realities of their potential impact continue to be recognized as they were before the recent bilateral agreement changes, and that we be afforded the benefits of the same fair trading rules applied to other industries.

All three Administrations which have addressed the issue of non-market suppliers' entry into the commercial launch services market have recognized the necessity of establishing rules to govern their participation until they make the transition to non-governmental entities in market economies. These rules (as described in the attached table) are set forth in the three current trade agreements with China, Russia, and the Ukraine. In essence, the three trade agreements permit these suppliers to enter the international commercial market, but within prescribed quantitative limits.

The agreements also require that the non-market economy providers sell at "fair prices." Fair prices are to be measured against market economy standards, because they relate to and are based on costs which can be calculated. We believe that the original reason for inclusion of fair pricing standards in the agreements remains valid.

Based on previous experience with the Chinese and the Russian agreements, and as documented by the USTR's own Report on Foreign Trade Barriers, it is clear that the pricing provisions of the trade agreements have not been

enforced very effectively. We believe that if there were better enforcement. these standards could significantly reduce the risks we now face.

We will continue to work with the Administration as they implement the agreements and improve their effectiveness. We certainly hope the interest of this Committee and its Members will aid in this effort.

Thank you.

COMPARISON OF SPACE LAUNCH SERVICE AGREEMENTS

	RUSSIA	RUSSIA RE-NEGOTIATED (1/30/96)	PRC	UKRAINE
GEO PAYLOADS	9 (8 with 1 grandfathered)	16 (15 with 1 grandfathered	15 (11 with 4 from previous agreement grandfathered)	5 plus additional 11 going to the Boeing Sea Launch Project
TRIGGER	None	If average number of launches is more than 24 per year, Russia may launch additional 4 for total of 20	If average number of launches is 20 or more per year, PRC may launch additional 5 for total of 20	If average number of launches is more than 24 per year, Ukrainians get one more and Sea Launch gets additional 3 for a total of 20
TERM	1993 - 2000	1996 - 2000	1994 - 2001	1996 - 2001
PRICE	No lower than 7 1/2% of lowest western bid	No lower than 15% of lowest western bid	No lower than 15% of lowest western bid	No lower than 15% of lowest western bid
LEO PAYLOADS	3 Proton Iridium launches approved. Others handled on case-by-case basis	3 Proton Iridium launches approved. Non-market economies can not get more than 50% of launches for any one system; consultation required	Non-market economies can not get more than 50% of launches of any one system; consultation required	Non-market economies can not get more than 50% of launches for any one system; consultation required

STATUS OF NON-MARKET ECONOMIES (NMEs) UNDER SPACE LAUNCH AGREEMENTS

COUNTRY	GRANDFATHERED	+	BASELINE	+	TRIGGER	=	TOTAL
RUSSIA	1	+	8		-		9
CHINA	4	+	11	+	5	=	20
							29

COUNTRY	GRANDFATHERED	+	BASELINE	+	TRIGGER	=	TOTAL
RUSSIA	1	+	15	+	4	=	20
CHINA (no change from existing situation)	4	+	11	+	5	=	20
UKRAINE (including sea launch)	-	+	16	+	4	=	20
							60

Mr. Dave WELDON. Thank you very much.
Mr. Montanaro?

STATEMENT OF MR. DAVID MONTANARO, VICE PRESIDENT, STRATEGIC RELATIONS, TELEDESIC

Mr. MONTANARO. Thank you, Mr. Chairman. Good afternoon, and members of the Committee.

The United States space launch strategy is a key component of our global competitiveness. It's my privilege to provide Teledesic's input on the opportunities available to the U.S. launch industry.

The convergence of computing and communications is resulting in the proliferation of commercial space opportunities. For these opportunities to truly prosper, access to space must increase in capacity and decrease in cost.

Until now, the market for launch vehicles was relatively inelastic. If a launch manufacturer reduced their price by fifty percent, demand did not increase significantly, if at all.

Until now, the customer base for launch services has been dominated by the government. The priorities were capability and capacity. Furthermore, any innovation was driven and financed by the government to meet its own needs. There was little incentive for launch manufacturers to innovate on their own.

For commercial space to truly prosper, access to space must be affordable. For access to space to be affordable, we need innovation. These innovations will only occur if the manufacturers have an incentive to respond to the needs of their customers; a customer who is increasingly a commercial company and decreasingly the government.

Today, we are witnessing a dramatic shift in the satellite industry. Very similar to networks on the ground, we've evolved from centralized systems built around a single mainframe computer to distributed networks of interconnected PCs, space-based satellite networks are evolving from centralized networks built around a single geostationary satellite to distributed networks built around many interconnected low-Earth-orbit satellites.

Teledesic, along with many other companies, are presently building communications systems based on multiple satellite constellations. Teledesic plans to deploy a satellite constellation of hundreds of satellites to globally provide affordable access to advanced, broadband communications.

This increased demand for satellites is a tremendous benefit to the U.S. industry. The U.S. already dominates satellite manufacturing, and U.S. companies will continue to provide the majority of hardware or software for these new systems.

But for the U.S. to fully realize this commercial space potential, fundamental shifts in the launch industry status quo must occur.

We must shift from a capability at any cost to a value driven mentality.

We must shift from launch as a barrier to entry to launch as an enabling technology.

We must shift from dependency on the government as the largest customer to the realization that commercial businesses will drive demand.

And finally, we must shift from government program mentality to commercial business practices.

The United States currently has two launch initiatives underway: EELV and RLV. As a large customer for launch services, Teledesic shares a common desire to have several reliable, low-cost options to space.

The dilemma we collectively face is how to support the development of new capability without rewarding and encouraging uncompetitive practices.

Structuring government investment to promote competition, achievement and innovation in much the same way as the commercial marketplace is critical.

For instance, in the commercial marketplace, development is an investment in future revenue, not a profit center. To the extent government directly subsidizes development, there is little incentive to reduce costs.

In the commercial marketplace, the first to market usually achieves market share. The government should utilize its funding to promote short cycle time developments.

In the commercial marketplace, the low-cost provider for a given capability usually dominates the market. The government should use its funding to reward low cost producers with more business.

In the commercial marketplace, it is the manufacturers' responsibility to provide quality and reliability at a reasonable price and to stand behind that product. The government should utilize its funding to reward quality, reliability, and competitive pricing with more business.

And finally, the United States should combine its demand with industry demand to leverage the launch industry, both new and existing, to bring reliable, low-cost access to space on line more quickly.

In closing, Teledesic believes that space has the potential to play a major role in the communications infrastructure of the future.

We are committed to bringing cost effective access to advanced information systems to all the world's citizens. This realization really has to do with providing low-cost access to space.

And we pledge to work with government to make that a reality.

Thank you.

[The prepared statement of Mr. Montanaro follows:]

Testimony of David Montanaro
Vice President, Strategic Relations, Teledesic Corporation
Before the
Subcommittee on Space and Aeronautics
U.S. House of Representatives
June 12, 1996

The United States' space launch strategy is a key component of our global competitiveness. It is my privilege to provide Teledesic's input on the *opportunities* available to the U.S. launch industry.

The U.S. launch industry is awakening to a new dawn. The convergence of computing and communications is resulting in the proliferation of commercial space opportunities. For these opportunities to truly prosper, access to space must increase in capacity and decrease in cost.

Until now, the market for launch vehicles was relatively inelastic. If a launch manufacturer reduced their price by 50%, demand did not increase significantly, if at all.

Why is this? The customer base has been dominated by the government. The government's priorities were capability and capacity, with cost a distant third. Furthermore, any innovation was driven and financed by the government to meet its own needs. There was little incentive for launch manufacturers to innovate on their own.

For commercial space to truly prosper, access to space must be affordable. For access to space to be affordable, launch manufacturers must make significant innovations. These innovations will only occur if the manufacturers have an incentive to respond to the needs of their customer; a customer who is increasingly a commercial company and decreasingly the government.

Today we are witnessing a dramatic shift in the satellite industry. Just as networks on the ground have evolved from centralized systems built around a single mainframe computer to distributed networks of interconnected PCs, space-based satellite networks are evolving from centralized networks relying on a single geostationary satellite to distributed networks of many interconnected low-Earth-orbit (LEO) satellites.

Teledesic, along with many other commercial companies like Globalstar, Iridium, and Orbcomm are presently building communications systems based on multiple satellite constellations. These LEO systems can best be distinguished by reference to their terrestrial counterparts: paging, cellular and fiber. The Big LEOs such as Iridium and Globalstar are the terrestrial equivalent of global cellular, while the Little LEOs, such as Orbcomm are comparable to global paging. Teledesic, which will be the satellite equivalent of fiber, plans to deploy a constellation of hundreds of satellites designed to bring affordable access to advanced, broadband communications services to all parts of the world that would not be economical to serve through traditional means. This increased demand for satellites is a tremendous benefit for U.S. industry. The U.S. already dominates satellite manufacturing and U.S. companies will continue to provide the majority of hardware for the constellations of the future.

For the U.S. to fully realize this commercial space potential, certain opportunities in the launch vehicle industry must be exploited. Fundamental shifts from the launch industry status quo must occur:

- A shift from 'capability at any cost' to a *value driven mentality*;
- A shift from launch as a barrier to entry to launch as an *enabling technology*;
- A shift from dependency on the government as the largest customer to the realization that *commercial businesses will drive demand*; and
- A shift from government program mentality to *commercial business processes.*

Generating these shifts is a formidable challenge. A challenge that can not be thoroughly addressed in this forum. However, let me suggest a couple of places where we could start looking. Let's look briefly at industry and academia and let's open our eyes to include lessons from our international competition.

Industry after industry has discovered a powerful positive feedback loop. Rising demand for a product will draw in competition. Competition will drive down prices. As prices go down, demand goes up. This positive feedback loop has been observed in many high-tech industries. Laws of supply and demand, economies of scale, and market adoption powerfully combine to reduce product prices. Should the launch industry be any different?

For additional insights from industry, we can turn to academia. The popular MIT study of the automobile industry, "The Machine That Changed The World" is one of the best compilations of the systems and philosophies that can be adopted to create the fundamental shifts necessary in the American launch industry.

The MIT study compared international automobile manufacturers and discovered that the Japanese system of 'lean production' produced high quality cars in far less time, with far fewer resources than their mass production counterparts. The study provides quantitative evidence to dispel the conventional wisdom that quality costs more, reliability costs more, shortening cycle time costs more, and reducing development time costs more. During the late 1980s, the American aerospace industry seemed unwilling to adopt these philosophies. Today, however, the aerospace industry has been more receptive. Beginning in 1992, MIT has forged the Lean Aircraft Initiative that consists of MIT, the Air Force, and 18 companies.

The point of all this is that in a commercial environment, customers place orders and the manufacturers take the risk of designing and producing the product. Healthy competition generally results in more choices and more innovation. In a healthy market, customers are satisfied and the strong manufacturers prosper and grow. To be a strong manufacturer, one must adopt the principles and philosophy of a "lean manufacturer." We should ask ourselves if the current government programs will encourage "lean" behavior.

The United States currently has two launch initiatives underway: EELV and SSTO. As a large customer for launch services, Teledesic shares a common desire to have several reliable, low-cost options for access to space. Our concern is that both of these initiatives may be too much, too

late. In addition, the programs as they are structured today, provide large development subsidies and, in many ways, preserve the status quo.

The dilemma we collectively face is how to support the development of new capability without rewarding and encouraging uncompetitive practices. As a starting point, we suggest building on the following foundation:

- The United States has much to gain both commercially and from a national security perspective from having ample capacity of reliable, low-cost launch vehicles;
- Reducing the cost to access space will fuel more space-based solutions which, in turn, will fuel more demand for launch;
- The United States, as a global leader in technology and innovation, has the most to gain from reducing the cost of space access; and
- The United States government is willing to make a substantial investment to ensure reliable, low-cost access to space.

Given the above we suggest structuring the United States' investments in such a way that promotes competition, achievement and innovation in much the same way as the commercial marketplace. For instance:

- In the commercial marketplace development is an investment in future revenue not a profit center. To the extent the government directly subsidizes development, there is little incentive to reduce development costs;
- In the commercial marketplace the first to market usually achieves early market share. The government should utilize its funding to promote rapid development and early availability by the launch providers;
- In the commercial marketplace the low-cost provider for a given capability usually dominates the market. The government should use its funding to reward the low-cost producer with more business;
- In the commercial marketplace it is the manufacturers' responsibility to provide quality and reliability at a reasonable price and to stand behind that product. The government should utilize its funding to reward quality, reliability and competitive pricing with more business; and
- The United States should combine its demand with industry demand to leverage the launch industry, both new and existing, to bring reliable, low-cost access to space on line more quickly.

In closing, Teledesic believes spaced-based infrastructure has the potential to play a major role in the telecommunications infrastructure of the world. Teledesic is committed to bringing cost-effective access to advanced information services to all the world's citizens. The realization of this potential depends on reducing the cost of access to space.

We appreciate the opportunity to have shared our thoughts with this distinguished committee. We pledge our support to continue working with government and industry to build upon the United States aerospace industry's proud heritage of accomplishment.

Teledesic

Teledesic Corporation

Through a broad, cooperative effort, Teledesic seeks to bring affordable access to advanced information services to all parts of the world that would not be economical to serve through traditional means.

Today, advanced telecommunications infrastructure is limited to the developed urban areas of the world. This leaves most of the world's population without access to even basic communications services. Even those areas with basic voice service get access through 100-year-old technology – analog, copper networks – that for the overwhelming part will never be upgraded to support digital, broadband services.

Utilizing a constellation of several hundred low-Earth-orbit satellites, Teledesic will enable affordable access to advanced information services to institutions and individuals anywhere in the world. This ability to deliver advanced, broadband, digital transmission capability at low-cost, regardless of location, distinguishes the Teledesic Network from other existing and proposed communications systems.

Teledesic was founded in 1990 and is headquartered in Kirkland, Washington, a suburb of Seattle. Teledesic's principal shareholders are Craig O. McCaw and William H. Gates III. Mr. McCaw, who leads the company as its Chairman, is the founder of McCaw Cellular Communications, which he built into the world's largest wireless communications company before its 1994 merger with AT&T. Mr. Gates is the co-founder, Chairman and CEO of Microsoft Corporation, the world's largest computer software company.

At the recent 1995 World Radio Conference, Teledesic received support from the developed and developing world alike, resulting in a new international satellite service designation for the frequencies necessary to accommodate the Teledesic Network. The action of the World Radio Conference mirrors Teledesic's success in obtaining a similar proposed designation from the US Federal Communications Commission (FCC). Teledesic is well-positioned for FCC licensing in 1996.

The Teledesic Network

Teledesic plans to begin service prior to the year 2002. Teledesic does not intend to market services directly to end-users. Rather, it will provide an open network for the delivery of such services by others. The Teledesic Network will enable local telephone companies and government authorities in host countries to extend their networks, both in terms of geographic scope and in the kinds of services they can offer. Ground-based gateways will enable service providers to offer seamless links to other wireline and wireless networks.

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Teledesic uses small, "earth-fixed" cells both for efficient spectrum utilization and to respect countries' territorial boundaries. Within a 53 by 53 km cell, the Network will be able to accommodate over 1,800 simultaneous 16 Kbps voice channels, 18 simultaneous T-1 (1.544 Mbps) channels, or any comparable combination of channel bandwidths. This represents a significant system capacity, equivalent to 20,000 simultaneous T-1 lines worldwide, with the potential for graceful growth to higher capacities. The Network offers high-capacity, "bandwidth-on-demand" through standard user terminals. Channel bandwidths are assigned dynamically and asymmetrically, and range from a minimum of 16 Kbps up to 2 Mbps on the uplink, and up to 28 Mbps on the downlink. Teledesic will also be able to provide a smaller number of high-rate channels at 155 Mbps to 1.2 Gbps for gateway connections and users with special needs. The low orbit and high frequency (30 GHz uplink/20 GHz downlink) allow the use of small, low-power terminals and antennas, with a cost comparable to that of a notebook computer.

Teledesic's engineering effort builds on previous work done in many advanced commercial and government satellite programs and was assisted by several government laboratories. The Teledesic system utilizes proven technology and experience from many U.S. defense programs, including the "Brilliant Pebbles" program, which was conceived as a similar orbiting global constellation of 1,000 small, advanced, semi-autonomous, interconnected satellites. Since 1990, Teledesic has drawn on the expertise of the contractors on that and many other programs for input into the early system design activities.

Design, construction, and deployment costs of the Teledesic Network are estimated at $9 billion. The Teledesic Network represents the first time that satellites and their associated subsystems will be designed and built in quantities large enough to be mass produced and tested. These substantial economies of scale enable a cost structure comparable to that of wireline service in advanced urban areas. To minimize launch costs and scheduling constraints, Teledesic's satellites will be compatible with more than 20 launch systems around the world and will be self-stacking so that several satellites can be deployed by a single launch vehicle.

Seamless Compatibility with Terrestrial Networks

Without knowing for certain what applications and data protocols a broadband network will be called upon to accommodate in the 21st century, it is reasonable to assume that those applications will be developed for the terrestrial fiber networks in the advanced urban areas of the developed world. To insure seamless compatibility with those networks, a satellite system must be designed with the same essential characteristics as those fiber networks – broadband channels, low error rates and low delays. Traditional geostationary satellites, which orbit at an altitude of 36,000 km, can never support fiber-like delays.

Even at the speed of light, round-trip communications through a geostationary satellite entail a transmission latency of approximately half a second. This latency is perceived as the annoying delays in many intercontinental phone calls. What can be an inconvenience

on analog voice transmissions, however, can be untenable for many real-time data applications such as videoconferencing, remote system control, and various data protocols. By contrast, Teledesic satellites will orbit at an altitude of only 700 km – 50 times closer to Earth than traditional geostationary satellites – which allows delays comparable to fiber.

Distributed vs. Centralized Architecture

Just as networks on the ground have evolved from centralized systems built around a single mainframe computer to distributed networks of interconnected PCs, space-based satellite networks are evolving from centralized networks relying on a single geostationary satellite to distributed networks of interconnected low-Earth-orbit satellites. In geostationary systems, any single satellite loss or failure is catastrophic to the system. To reduce this contingency to acceptable levels, reliability must be engineered far along toward the point of diminishing returns where further gains in reliability are achieved only at a very high cost.

With a distributed network, like the Teledesic Network, reliability can be built into the network rather than the individual unit, reducing the complexity and cost of the individual satellites and enabling more streamlined, automated manufacturing processes and associated design enhancements. In its distributed architecture, dynamic routing, and robust scalability, the Teledesic Network emulates the most famous distributed network, the Internet, while adding the benefits of real-time capability and location-insensitive access.

Low-Earth-Orbit Satellite Systems

The evolution from geostationary to low-Earth-orbit (LEO) satellites has resulted in a number of proposed global satellite systems, which can be grouped into three distinct types. These LEO systems can best be distinguished by reference to their terrestrial counterparts: paging, cellular, and fiber.

System Type	Little LEO	Big LEO	Broadband LEO
Example	Starsys, ORBCOMM	Iridium, Globalstar, ICO	Teledesic
Terrestrial Counterpart	Paging	Cellular	Fiber

On the ground, cellular and fiber services are complementary, not competitive because they offer fundamentally different kinds of services. Similarly, Teledesic and other systems like Iridium are complementary rather than competitive because they are providing distinctly different services to different markets. The Big LEOs, for example, provide premium-priced, narrowband mobile voice service, whereas Teledesic provides essentially fixed, broadband connections at costs comparable to urban wireline service.

The Market for Teledesic

The convergence of computing and communications is causing all things one associates with a high standard of living – from education and health care to economic development and public services – to become dependent on an ever-increasing flow of information. In highly urbanized areas, this demand for information is being satisfied by the high-bandwidth and high-quality connections of fiber optics. The advanced information services that high-bandwidth, low-latency fiber makes possible are becoming integral to the way businesses create value and the manner in which individuals live their lives. Increasingly, institutions and individuals are utilizing broadband connections for Internet access, computer networking, aggregation and trunking of voice lines, and telecommuting. But step out of the cities, and these advanced information services become unavailable at any price. Despite the vast promise of the Information Superhighway, these services are simply unavailable to most of the world's citizens and geography.

The Teledesic Network will seamlessly extend the existing terrestrial, fiber-based infrastructure to provide advanced information services anywhere on Earth. Customers will range from the information workers unwilling to be confined in increasingly congested cities, to countries backhauling aggregated voice lines from remote cellular sites, to multinational corporations connecting branch offices throughout the world into their existing global networks. Whenever and wherever institutions and individuals want access to the advanced information services currently available only in the most highly developed urban areas, the Teledesic Network can provide seamless connectivity.

By achieving significant economies of scale in all aspects of the satellite and network design, Teledesic will enable these broadband connections worldwide at rates comparable to existing terrestrial services. Teledesic offers the potential to become the ubiquitous information infrastructure for much of the developed and developing world.

Teledesic Alliances

The Teledesic System is a global undertaking and beyond the capabilities of any one company or country. With a supportive international regulatory structure in place and United States licensing activities underway, Teledesic is now in a position to actively pursue key global alliances. These partnerships will be organized into three alliance groups, each focused on a particular areas of interest: space infrastructure, service provision and investment.

The Teledesic industrial alliance will be made up of organizations that will collaboratively design, develop, deploy and eventually operate the space infrastructure. In addition to technical expertise, the ability to work collaboratively as part of a larger team, commitment to aggressive cost and schedule goals, and general alignment of corporate vision will weigh heavily in the alliance formation process. By combining traditional aerospace organizations with contemporary commercial and lean manufacturing expertise, Teledesic will utilize the industrial alliance to build a team

uniquely qualified for the development of the Teledesic Network.

The Teledesic service provider alliance will be made up of organizations that ultimately will offer Teledesic services on a local or regional basis. Initially, this alliance will consist of a small number of organizations from around the world that share Teledesic's vision. Members of the service provider alliance are expected to provide active participation and support in the areas of licensing, regulatory advocacy, market positioning and network design.

The Teledesic investor alliance will consist of those entities with an ownership stake in the Teledesic Network. Early alliance members are expected typically to be large regional or global telecommunications providers. For these organizations, investing in infrastructure and new technology is a normal part of their business model. Ultimately, investment in Teledesic will expand to include a variety of more traditional sources of capital from around the world.

It is important, especially in the early stages of development, that all partners share strategic alignment with Teledesic. Partners may participate in more than one of these alliances. Building these strong alliances will be essential to Teledesic's success.

Mr. Dave WELDON. Thank you, Mr. Montanaro.
Mr. O'Connor.

STATEMENT OF MR. EDWARD O'CONNOR, JR., EXECUTIVE DIRECTOR, SPACEPORT FLORIDA AUTHORITY

Mr. O'CONNOR. Thank you, Mr. Chairman, members of the Committee, for giving me the opportunity to express to you some of the concerns in the State of Florida.

As a governmental entity, we look at the process of commercial space from the standpoint of the jobs it creates and the employment opportunity as well as the industrial base that can be derived from a strong space program.

In that respect, we are greatly concerned that we have gone from what was a predominant goal in commercial space launch to now something that is under 30 percent and which is now being attacked by other foreign launch providers from non-market economies in a manner which could preclude the ability of this industry to rebuild itself a new technology without a tremendous amount of government investment.

We strongly encourage this Committee in going forth with its program of looking at the different issues associated with space launch.

In the State of Florida, we feel that we can achieve a launch rate of 50 launches per year by the year 2005 if we're given the opportunity to open the doors to U.S. commercial industry to do what they do best, which is to compete.

With that view in mind, we have two areas of specific concern I would like to address for a moment, if I might.

The first is the changing role of the United States Air Force and Department of Defense. In the past, they have been the predominant user of the ranges of this nation.

Now they are becoming the marginal users, if you would, but they still maintain the resources and the assets. This year, at Cape Canaveral Air Force Station, Air Force controlled military launches will constitute less than 20 percent of the launch activity that occurs. The rest of it will be commercial.

But they are still charged with the responsibility for maintaining a vast infrastructure to preserve not only the military capability for launch but also to support the commercial launch companies.

When we look at the decreasing Department of Defense budgets, we see an eroding capability to support industry with no substitute mechanism being put in place to support a more robust launch activity.

We would strongly suggest that the Department of Transportation and FAA be tasked to work with the Air Force to determine the future course of a cost-effective range support structure that can support the new launch systems that this country needs to put on the marketplace.

We are already seeing some of the smaller impacts associated with diminishing military capacity to support commercial industry.

Recently, a request for support was placed by one of our commercial launch companies. The launch response from the ranges was delayed by seven months because of inability to support the necessary technical analysis.

In a vastly competitive marketplace, a seven-month delay because of lack of ability to do a relatively simple study, is going to be continually intolerable. So we would strongly suggest the Committee look at that particular part of our national launch capacity.

We're also concerned in the area of licensing. As Congressman Weldon has mentioned, there has been a delay in the issuance of final launch regulatory framework.

The State Government of Florida is in a unique and possibly a more difficult situation than others. As a governmental entity, we are restricted in the degree of responsibility that we can sign up for under state law. We have to clearly understand our responsibilities when we sign a commercial contract. We can't have open doors for growing requirements that may appear at a later time.

In that regard, we've assigned all technical and safety responsibility for our launch site operations to the United States Air Force. We are hopeful that the Department of Transportation, in their deliberations, will determine that when a federal agency, such as the United States Air Force, agrees to do all the critical oversight functions, it is no longer a licensable function of the state government.

The issuance of a license to a state governmental entity implies great responsibility. The State of Florida recognizes that, and wants to make sure that it is a clear partner in that process of developing that responsibility.

If at some future time, the Air Force is not able to provide the technical oversight, the state would certainly support state government becoming a licensed operator at Cape Canaveral Air Force Station.

This is a fairly technical issue but it's very important when you're in the process of signing contracts for industry and making long-term commitments for a launch facility.

I'd like to thank the Committee for giving me the opportunity to express some of our views from Florida, and again thank you for your attention to a very vital industrial base issue for this country.

[The prepared statement of Mr. O'Connor, Jr. follows:]

Remarks of Edward A. O'Connor Jr.
Executive Director, Spaceport Florida Authority
Before the
U.S. House of Representatives Subcommittee on Space & Aeronautics
June 12, 1996

Mr. Chairman and Members of the Subcommittee:

Thank you for the opportunity to present the views of the Spaceport Florida Authority, an agency of the State of Florida, on the subject of U.S. Space Launch Strategy. Before I provide those views, however, I would like to provide a brief background regarding the Spaceport Authority, including its purpose, goals and major projects.

The Spaceport Authority was created by state law in 1989 to support statewide space-related economic development, and to assist the development of the space transportation industry at Cape Canaveral. In carrying out its mission for Florida, the Spaceport Authority has initiated projects that improve *national* space industry competitiveness. Examples include a state-financed rocket motor facility for the Titan IV program; a liquid hydrogen fuel production facility; a state-financed NASA museum/education facility honoring the Apollo program; a NASA *Center for the Commercial Development of Space*; a state-financed expansion of U.S. Space Camp; and the state sponsored and financed conversion of Launch Complex 46 to accommodate new commercial, military and civil launch programs at Cape Canaveral Air Station.

Modification of Launch Complex 46 into a *multi-user* facility that can be utilized by several launch service companies (for federal and commercial programs) and the military is one example of how the Spaceport Authority supports the growth and competitiveness of the U.S. space industry. It is also an example of how a state government can contribute to the nation's space launch strategy.

That is, the Spaceport Authority has provided the nation with a new capability that can and will be used by several launch companies without the requirement for each company to invest $15-20 million in new launch infrastructure. The savings in infrastructure investment costs, which are estimated at more than $1 million per launch, can be utilized to reduce launch service costs to the satellite industry and the federal government.

The Spaceport Authority also seeks to work with the federal government and U.S. industry to open Cape Canaveral's infrastructure for use by new launch systems, including international joint-ventures. Florida Governor Lawton Chiles has proposed that Cape Canaveral be transitioned into an "International Spaceport" to establish the Cape as

the world's pre-eminent launch location, increase U.S. launch industry jobs, and provide new domestic launch alternatives for the U.S. and international satellite manufacturers.

Also vital to the international competitiveness of the U.S. space industry is the continued availability of range support services now provided by the U.S. Air Force. Unfortunately, this availability is jeopardized by shrinking Air Force resources to support commercial and civil launch requirements. The Air Force's budget for operating and maintaining vital launch support capabilities, particularly at Cape Canaveral, has declined in step with military launch requirements. Meanwhile, the commercial launch market is increasing.

The fact is that, in 1995, the number of commercial launches (nine) exceeded the number of federal non-Shuttle government launches (four) *for the first time*. This is not a aberration, but instead is a trend that will continue into the next century and beyond. The Air Force's role in providing a *National Range* system for space launch support is essential for maintaining and increasing launch competitiveness.

Florida's goal is for Cape Canaveral to accommodate 50 launches per year by 2005 (a rate not uncommon in the early 1960s). This launch rate will allow the Cape to achieve its maximum efficiency for facilities and personnel. The goal would convert the Cape's "standing army" of launch and range personnel into a "working army" of launch industry professionals. The goal is also reasonable, based on market projections developed by the Department of Transportation, industry and Arianespace, our primary competitor.

The Spaceport Authority is concerned that, as the budget of the Department of Defense declines, the Air Force will not be able to continue to provide the commercial space industry with support services. The effect of such an inability would be to harm an industry that provides essential services to the federal government while making a positive contribution to the nation's balance of trade.

There are several actions by which the Congress may assist in resolving these concerns:

First, the Congress should establish funding responsibility for National Range management. This would provide an assured and stable capability for managing our nation's launch range resources, in much the same way that FAA manages our nation's non-military airspace. Precedent for this can be found in the federal government's funding of the Coast Guard under USDOT, to support commercial maritime activities during peacetime and defense maritime activities during times of conflict.

Second, the Congress should clarify policies and procedures for charging the commercial space industry for its use of range property and services. Rather than pass direct costs along to individual users, the federal government should bear the cost of operating the nation's launch ranges because they are public infrastructure (similar to the national air

traffic control system) that serve a common public transportation need and are required to accommodate military and civil space launch systems.

Third, the Congress could establish a short-term grant program within the Department of Transportation that would allow state-sponsored spaceport authorities to leverage investments made by state governments, industry, the Air Force, NASA, as well as the Federal Aviation Administration to develop or improve essential space transportation infrastructure. Such a grant program would be consistent with federal support for other modes of transportation, including highways, seaports and airports.

Fourth, the federal government should provide a tax exemption for bonds issued for the development of space transportation infrastructure. This consideration is already provided to spaceport bonds by some state governments, including the State of Florida. It is the same consideration that the federal government already provides to bonds issued for the development of airports and seaports.

There is one additional concern I would like to bring to the Subcommittee's attention. That is the requirement for licensing of launch site operators under the Commercial Space Transportation Act of 1984, as amended. The Spaceport Authority expects launch operations to begin at Launch Complex 46 as early as March 1997, less than nine months from now. The Spaceport Authority will *not* itself conduct launch operations, nor perform any critical or significant role in the launch process. These launch functions will be provided by the launch companies and federal personnel, and therefore should not make the Spaceport Authority subject to site operators licensing requirements. The Spaceport Authority also requests that this subcommittee take action to clarify licensing requirements in order to ensure that they are consistent with the intent of federal law and policy.

Once again, I thank you for the opportunity to appear before you today. I am prepared to answer any questions that you might have.

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Mr. Dave WELDON. Thank you, Mr. O'Connor.
Mr. Pat Ladner of Alaska?

STATEMENT OF MR. PAT LADNER, EXECUTIVE DIRECTOR, ALASKA AEROSPACE DEVELOPMENT CORPORATION

Mr. LADNER. Thank you, Mr. Chairman, for the opportunity to provide testimony about what Alaska's doing as far as a launch site, as well as for polar or high latitude ground stations.

I'd also like to thank members of the Committee who traveled to Alaska last summer and not only visited our state but had the opportunity to go out and visit the Kodiak Launch Complex.

Alaska Aerospace Development Corporation is a state agency. It was legislated into existence in 1991. Alaska's very serious about supporting the commercial space launch industry and the state has spent almost $3 million of state funds in achieving the design and those things necessary to make the Kodiak Launch Complex a reality.

There are several things that I think if we are truly wanting to help commercial space, we have to look at several things, especially from a state spaceport standpoint.

The Commercial Space Launch Act of 1984 as amended at that time was very much needed to help commercial space.

Since that time, however, we have had state spaceport agencies like Ed O'Connor and Don Smith and Virginia and New Mexico. And what you find in those spaceports and the spaceport agencies are people who do have operational expertise. I mean, Ed's been a Titan Mission Director, I've been a mission director on Delta, and so has a lot of other people.

So we do have that requisite experience now to do those types of things necessary to operate a spaceport.

I think that the states also, especially in our case, we are not on a federal military range, so we are a little bit different. But I think the state spaceports do have the capability to more or less control their own destiny.

And I think when you look at it, since the states are ultimately responsible for safety and for the operations, I think it's something to consider to allow the states to have more control in that licensing process.

I think one of the major mistakes of the Commercial Space Launch Act was the end result being the issuance of a license being a major federal action. When you call that into existence, you call in a lot of oversight that some may be unnecessary. It throws in a lot of problems.

And our state being a highly resource-oriented state, we're very concerned about the environment. That's our livelihood. And we protect it very well. And I think the states have that capability to do all of those reviews and analyses required to carry out that function.

So I think also that the spaceports have the necessary technical support in the contractors that are partners and active participants in those spaceport areas.

We look forward to being a participant in the commercial space activities and we believe that we bring a lot to those activities by offering a launch site that is not on federal property, and because

of that it offers a lot of freedom, it offers a lot of operating capability that is not sometimes permissible on federal ranges.

And that is not to say that we would in any way forsake safety because, as you well know, if you mess up safety, you kind of put yourself out of business.

So I think we bring a lot to the table, and I think we as spaceports could work very well together.

In all fairness to OCST, they have worked very, very closely with us recently on achieving our environment assessment. As I said in my written testimony, getting there was a problem, but once we got to the point of working very closely together, they have done an excellent job and I think so have all of our people.

So with that, Mr. Chairman, I appreciate the opportunity and I'll be glad to answer any questions that you have.

[The prepared statement of Mr. Ladner follows:]

Remarks of H.P. Ladner, Executive Director
Alaska Aerospace Development Corp.
Before the U.S. House of Representatives
Committee on Science, Subcommittee on Space and Aeronautics
June 12, 1996

Mr. Chairman and Members of the Subcommittee:

Thank you for the opportunity to testify today regarding the Alaska Aerospace Development Corporation and its efforts to develop the nation's first commercial spaceport -- the Kodiak Launch Complex -- on Kodiak Island, Alaska. Today I will bring to your attention federal government obstacles that currently threaten to impede the significant progress made toward that end. Before I discuss those obstacles, however, I would like to clarify for you the character of the Alaska Aerospace Development Corporation or "AADC".

Despite some confusion about its name and the status of some other "spaceports", AADC is a subcomponent of state government. AADC has been granted state duties and authorities, including the right to issue state bonds, and its employees are state government employees.

The Alaska state legislature created AADC in 1991 for the primary purpose of diversifying the state's economy which is heavily reliant upon its natural resources, including fishing and timber. In order to accomplish that purpose, AADC is developing a ground control station for multiple satellite users in Fairbanks and a launch complex for multiple launch vehicles on Kodiak Island. The development of both projects is funded, in large part, by the State of Alaska and its industry partners.

During the development of the Kodiak Launch Complex or "KLC", it has been necessary for AADC to interact with the Department of Transportation. In its interactions with that agency, AADC has encountered two obstacles which have had the effect of slowing, although not stopping, development of the KLC.

Both of the problems experienced by AADC involve the issue of obtaining a launch site operators license. As currently written, the Commercial Space Transportation Act, as amended, requires launch site operators to obtain a license from the Department of Transportation or "DOT".

First, AADC has been impacted by DOT's interpretation of the Commercial Space Transportation Act that AADC's requirement to obtain a launch site operators license means that DOT has the authority to decide whether, where, when, and how the Kodiak Launch Complex may be <u>built</u> as well as how it is to be operated. DOT claims this authority through a provision of the National Environmental Protection Act (42 U.S.C.

4332) which requires federal government agencies to review "major federal actions". It is unclear to AADC how the construction and operation of a launch site which is paid for by state and industry funds can be properly construed as a major "federal" action.

In fairness to DOT, after they decided to get onboard with completing the Environmental Assessment, they have done a good job. The problem has been all of the consternation to get to that point. The Department of Transportation has recently agreed to complete its review of the environmental assessment completed for the KLC no later than June 1996. If this deadline is met, AADC will be able to begin construction of the KLC during fall 1996 in time to meet its anticipated launch schedule.

Second, AADC has been impacted by DOT's failure to issue regulations for launch site operators. These regulations have not been issued despite the fact that Congress passed the Commercial Space Launch Act, which requires the regulations, 12 years ago.

AADC expects launch operations to begin at the Kodiak Launch Complex in fall 1997, a little more than one year from now. As such, it is similarly situated with spaceports located in Florida and California That is, if the Commercial Space Launch Act is uniformly applied to all spaceports, these three spaceports will begin launch operations within 12 months and there are no federal regulations to be followed for launch site operations. The timing is especially critical because it appears that there is insufficient time between now and then for DOT to issue final launch site operator regulations and provide a sufficient time for adequate review and input by those who are affected.

It should be noted that DOT has also failed to issue financial responsibility regulations required by the Commercial Space Launch Act during the same time period -- 1984 to 1996. Because DOT has failed to fulfill its statutory duty of creating these regulations, it is imperative that DOT's licensing authority be transferred to state governments (or to those state governments willing and able to conduct such licensing activities).

The transfer from the federal government to state governments of licensing authority for launch site operators as well as launches is appropriate for two reasons First, state governments currently have the technical expertise necessary to regulate both launch site operators and launches State governments already regulate similar activities, such as airports and automobiles, and they can move more quickly because they are not burdened with the great number of levels of bureaucracy. Can you imagine if DOT issued drivers licenses? They could invoke NEPA on the automobile industry

Second, state governments have the primary interest in the operation of launch sites and launches That is because any damage that may result as the cause of these activities would harm the citizens and property of that state. It has long been the jurisdiction of states to protect the welfare of their citizens and the property within their boundaries

When licensing authority is transferred to state governments, the federal government should retain an advisory rather than a regulatory role in the licensing process. As an advisor, the federal government would be limited to issues of foreign policy and national defense.

In order to transfer the licensing authority to state governments, legislation will be required in the form of amendments to the Commercial Space Launch Act. It is essential that the Science Committee initiate such amendments as soon as possible.

Once again, I thank you for an opportunity to appear before the Space and Aeronautics Subcommittee. I am prepared to answer any questions you may have.

Mr. Dave WELDON. Thank you.
Mr. Donald Smith.

STATEMENT OF MR. DONALD D. SMITH, EXECUTIVE DIRECTOR, WESTERN COMMERCIAL SPACE CENTER

Mr. SMITH. Thank you, Mr. Chairman.

The Western Commercial Space Center has been designated by state statute as the California Spaceport Authority due to then Assembly-woman Seastrand's efforts and this Authority has the responsibility for developing the California spaceport and commercial space industry throughout the State of California.

Today the commercial space industry is estimated to bring over 100,000 new jobs to the State of California in the next ten years. Over 5,000 have already been created by Motorola's Iridium program when they contracted with Lockheed to build the satellites, and with McDonnell Douglas to launch those satellites at Vandenberg.

Today, the state legislature has put a new line item in our state budget to create a matching fund to build a California Commercial Space Highway system. This system not only includes the California spaceport, but an on-orbit control system, hopefully using the Air Force's satellite control network at Sunnyvale, the recovery of any future capabilities of Edwards Air Force Base and even an on-orbit gas station, a ground based laser at China Lake which we hope will be able to recharge satellites in space.

The problem that we are facing today in California is of course the problem everyone faces and that is the low cost access to space at our $10,000 a pound. At Vandenberg, we're trying to reduce to $5,000 a pound. We believe we can do this by reducing the cost of spaceport operations.

And as Mr. Davis pointed out this morning, presently the Armed Forces only charges the delta cost, but we've crossed over the dividing line in Florida and as he pointed out, next year, we'll cross over the dividing line at Vandenberg, meaning that there will be more commercial space launches and military and civil launches.

So what we would like to see Congress take on is the task of defining a new federal program which will develop new space infrastructure, whether it be under DOD, DOT, NASA or wherever.

We will be needing in the future on-orbit control systems, we'll be needing grant funds for the state spaceports to build their infrastructure.

As I indicated, the state legislature has developed this grant matching fund and the match can be private industry, and that's our preferred approach.

The California spaceport has been developed as a joint venture with ITT in I should say a limited partnership. They're putting up $31 million. We, the Western Commercial Space Center have put up approximately $6 million.

That type of public private partnership we feel will be developed throughout the state but we still believe that there will need to be future federal funds coming in to develop what I would consider an international space control system.

If the U.S. doesn't take the lead on this, some other country will.

With that, I would like to open up for any questions.

[The prepared statement of Mr. Smith follows:]

12 June 1996

Mr. Chairman, thank you for inviting me to testify before this Committee on the need for a U.S. Space Launch Strategy. I am Donald David Smith, Executive Director of the Western Commercial Space Center, a California non-profit corporation designated by statute as the California Spaceport Authority with a charter to develop the commercial California Spaceport and commercial space infrastructure throughout the State.

California began the reduction in Federally supported high-tech jobs much earlier than the rest of the Nation when the Air Force Shuttle program was canceled in 1986. The 4000 jobs lost at Vandenberg Air Force Base by this action has now been increased by a factor of 100 throughout the State by the Defense and NASA budget decreases and the military base closures. California now has 28 military bases closed or being closed, more than all the rest of the states combined. The commercial space industry is now estimated to bring over 100,000 new jobs to California over the next ten years with 5000 being created today by Motorola's Iridium Communication Satellite system being manufactured in California and launched from Vandenberg beginning this summer.

The grass roots community support structure that started 10 years ago on California's Central Coast to address Shuttle job losses has now matured into the California Spaceport Authority with the aid of far sighted politicians such as Assemblyman Eric Seastrand and. following his death, his wife Assemblywoman Andrea Seastrand, now Congresswoman Andrea Seastrand from the State's 22nd Congressional District. This growth has enjoyed bipartisan support including State Senator Jack O'Connell, Assemblyman Tom Bordonaro and U.S. Senators Feinstein and Boxer.

Today the California Legislature is adding a line item to the State budget providing a grant or private investment matching fund to create the California Commercial Space Highway system. This highway will utilize the California Spaceport as an on-ramp, the Sunnyvale node of the Air Force Satellite Control Network as the highway control system, the Selene ground based laser at Ridgecrest (China Lake Naval Air Weapons Center) as the on-orbit satellite recharging system or "gas station", and Edwards Air Force Base as an off-ramp. Other elements from various parts of California will be added to this system as they become needed. The preferred development approach is the public private partnership model created by WCSC and ITT to build and operate the California Spaceport using the for-profit partnership, Spaceport Systems International.

As you know the California Spaceport is limited by its geography and the expendable launch vehicle safety constraints to address only the north-south launch azimuths which place satellites into high inclination or "polar" orbits. However, as we assessed the potential commercial market for polar orbit we came to the conclusion that a large majority of the next ten years commercial satellite business will be oriented to our launch azimuth. We have determined that over 1000 commercial satellites will be launched into high inclination orbits over the next ten years and to successfully achieve a significant market share of those commercial launches, the California Spaceport and the launch vehicle operators will have to bring costs down from the present average of $10,000 per pound into low earth orbit (LEO) to at least $5000 per pound. We recognize that the single stage to orbit (SSTO) launch vehicle is the ultimate answer to launch

cost reduction, but believe that a commercially viable, licensed SSTO launch vehicle is 15 to 20 years in the future and well outside our ten year market goal. We unequivocally support the X-33 program and even want a polar orbit recovery vehicle added to it, however our near term cost reduction must be accomplished by a combination of launch vehicle, operations and federal support cost reductions.

We were distressed when we learned from a press release that the bilateral negotiations with China on commercial space launches included a statement to the effect that the U.S. would not object to China achieving up to 50% of the LEO market, which means to us the polar market. We know that we are going to have to compete for our share, but believe that the Administration does not understand the economic significance of their "giving away half this market". To successfully compete, the California Spaceport Authority wants the Federal government to do the following things: 1 - allow foreign launch vehicles to be launched from state designated spaceports; 2 - provide a single Federal agency for spaceport regulation, infrastructure funding and space traffic control; and 3 - provide state designated spaceports first access to all federal excess facilities including surplus ICBM launch vehicles.

1 - Whenever the Federal government negotiates or allows U.S. built satellites to be launched by a foreign booster, every effort should be made to encourage that foreign entity to launch from a U.S. spaceport. All satellite manufacturers that we have talked with have indicated that they would much prefer to launch in this country.

2 - Today the California Spaceport Authority is working with four Federal agencies to develop the California Spaceport; DOD, DOT, DOC and NASA. We would prefer to have a single point of contact for all aspects of Federal interface with state designated spaceports. All spaceport states need increased Federal funding to develop space launch and recovery infrastructure within the state and to develop an international on-orbit control and safety system world wide. Like the start of the Interstate Highway Program in the 1950s, the U.S. government must take the lead in the development of a new world wide space highway system in the 1990s. We understand that we are asking for the creation of a new Federal funding program at a time when all other programs are undergoing reductions in order to balance the budget, but we thoroughly believe that the predominant economic power in the 21st Century will be that country which has developed the leading space faring capability for business.

3 - Under the present policy the DOD is trying to determine the best educational and research missions for the surplus ICBM vehicles while the spaceport states are piling up unsatisfied educational and research launch requests. The California Spaceport Authority requests that all surplus launch vehicles, whether ICBMs, IRBMs, targets, etc., be provided to state designated spaceports based on applications and funding capabilities worked out with such organizations as the University Space Research Association (USRA), State Space Grant Foundations, high school education programs, etc.

The final request that I want to make is that Congress support the California Spaceport Authority recommendation to NASA that a cheap space recovery vehicle be an added objective of the X-33 Program. One of the technology goals of X-33 is the development of a light weight re-entry

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thermal protection system (TPS). This TPS applied to an unmanned automated reusable recovery vehicle would greatly benefit the development of manufacturing satellites in polar orbit. The unique capabilities of the near-polar sun synchronous orbit have drawn much interest in developing satellites to manufacture various high value commodities in this regime, but at this time we do not have any capability to return such commodities to earth cheaply. This X-33 addition would benefit both California and New Mexico's spaceports.

Thank you, and I will be happy to answer any questions you might have about California's spaceport and commercial space efforts.

Mr. Dave WELDON. Thank you, Mr. Smith.

I'd like to begin with a question to Mr. O'Connor.

Earlier we heard some testimony from the Office of OCST that the federal government is doing all they can, and there actually are some provisions and regulations that are allowing you to get started.

Can you elaborate a little bit more for me as to whether or not you perceive that there is inefficiency here in issuing regulations in a timely fashion, and what kind of impact it actually has on your ability to do business?

Mr. O'CONNOR. I'd be pleased to comment on that.

In looking at the timeliness of the issuing of regulations, we've expressed concern, since the creation of the spaceport five years ago, six years ago now, that there was not clear guidance as to the assignment of responsibility under a regulatory framework called the on-site operator's license.

Being a state regulatory authority in Spaceport Florida, we are very concerned about how you structure those responsibilities and licensing requirements.

It is very difficult in a regulatory sense to deal with guidelines in the contract sense to deal with guidelines in that you cannot quantify the amount of risk that is being agreed to.

So we find it impossible to deal with something called the guidelines where we actually need to have a legal framework defining responsibility.

So we have great difficulty in our contracts, when we are contracting today for use of our launch facilities that the state will provide. We have altered the position that we have taken in the past as far as in operation of our launch facilities because of the lack of regulatory framework.

That's why, as I alluded to earlier, we're now signing up with the United States Air Force to provide all of what we would believe would be the regulatory licensing requirements, things such as safety of flight, pad safety, supervision of activities, and facilities.

So as a state agency, we will be becoming basically turning the site over jointly to the Air Force and to the commercial customer that will use the facility.

Florida will back away from it. And the outcome of the regulatory framework, had it been issued earlier, might have been different the degree of how we would establish relationships.

Under our state constitution and our state legal processes, I have limitations as to executive authority of the state authority to execute contracts that might have some open-ended liability questions.

So we are very concerned when there is a possibility that at a later time, a license might be issued which would refer back and affect the contracts that have already been signed, so that's why we've been very concerned about this issue for quite awhile.

We do applaud OCST now for taking this as a higher priority issue. We congratulate them on this, and hope they'll move forward on that very quickly. After they do that for future contracts, it may be something that the state will reassess its activities on how it formulates its contractual relationships not only in the United States Air Force, but also to its customer base and the commercial space launchers that would like to use our facilities.

Mr. Dave WELDON. Would either of you other two gentlemen representing Alaska and California want to comment on this any further, give a different perspective?

Mr. SMITH. With respect to the California spaceport, we have been working with the Department of Transportation OCST prior to going under FAA, and have developed a consensus, so to speak, on the licensing application. We expect to submit our formal license application this month, and hopefully will receive our operating license.

We have a unique situation. The Western Commercial Space Center has contracted to this partnership with ITT to operate and develop the spaceport, and therefore they will be the operator of it, and we'll receive the operating supplies and support.

Mr. Dave WELDON. So you would say that the delay in issuing regulations has not been an issue?

Mr. SMITH. No, sir, it has not. Again, we're in a different organizational structure than the State of Florida. They have different requirements than we do.

We of course have operated under DOD's policies and satisfied all their requirements and then subsequently worked with the Office of Commercial Space Transportation.

Mr. Dave WELDON. Thank you very much.

I'd like to now recognize the gentleman from California, Mr. Rohrabacher.

Mr. ROHRABACHER. Thank you very much, Mr. Chairman.

First of all, I'd like to mention in earlier testimony, I think that price alone isn't the only factor that we need to understand as far as who is going to have what share of the market.

I know, and Mr. Ebner talks in his testimony about the Delta system, the rocket system of McDonnell Douglas, which has a nearly flawless record, if not a flawless record, as compared to the Chinese who have nearly, I have to say, a totally flawed record in the sense that every other rocket seems to blow up.

With this in mind, I think that some of the fears that our corporations had in the past of what the marketplace is going to be like in the post-Cold War world are not going to be realized because people will go to quality, especially when it comes to space transportation.

I would note, from Mr. Ebner's testimony, that he talks about the development of the Delta III project which has been done without taxpayer dollars.

I'm sorry I missed your testimony, Mr. Ebner, because I was down on the floor, and there was supposed to be an amendment I was supposed to speak to and it never came up, so I came back here to participate.

But anyway, I would like to note that the Delta III Rocket System is not being developed with the use of taxpayer moneys, it's being developed instead by a contract, I believe, with Hughes Corporation and a contract with Hughes is being used as the basis for the money that's necessary to develop this next stage of the Delta.

Which goes to my question, both Lockheed and McDonnell Douglas are involved in competition for the X-33 reusable launch system. And this is for both of you gentlemen.

Is it possible, once we get to a certain stage, that this reusable launch system can be developed like the Delta III, based on a contract perhaps with this other gentleman who is sitting in the middle of the table here? Could money be used from a contract to fully develop the system, a reusable launch system rather than totally relying on government largess?

Mr. DAILEY. I think, as you know, Congressman, the current competition on RLV does require cost sharing on the part of industry to quite a significant degree in order to be competitive. That is part of our bid process.

So while it is important in our mind to have the government support for development of such an important program like this, and a technology program like this, it should be noted that we are having to invest quite a bit of money in this type of project, which is still confidential due to the bid process.

Mr. EBNER. Beyond what Dr. Dailey says, Congressman Rohrabacher, there would not be any future for the X-33 program or the RLV program, I should say, if there weren't some anticipated commercial use for the future.

Administrator Goldin has taken that position publicly. The view is that eventually this program will be able to function hopefully without any government funds or involvement down the road except for government uses or government payloads.

We don't know yet, it's a little early to say how that's going to work, but it's pretty clear that not only is corporate investment going to be involved in the X-33 program, but eventually a real drive towards total commercialization is the objective of the program.

Mr. ROHRABACHER. Maybe we should ask Mr. Montanaro this question.

If someone comes to you and they offer you a contract, either Lockheed, McDonnell Douglas, or whoever the corporation is, are you going to accept, as a private sector person who needs a service, are you going to accept that the money is going to be used for development of a new system that would be used to actually fulfill the contract?

Mr. MONTANARO. I think you asked an excellent question, Congressman Rohrabacher, and in fact we are in conversations with both of the organizations represented by the gentlemen to my left.

We have a need for quite a large amount of launch capability. We too ourselves are a start up company, and we are looking to take, and I think we've got to look at the industry from where it is today, which is largely government-dominated, to where it wants to be in the future, which is ultimately commercial.

If we take it from truly commercial practices, when you buy an automobile, you don't fund the development of that automobile. You pay for the services as it's delivered, and a portion of that service goes back into that.

So we're very much looking to make commitments for launch. We've set some very aggressive pricing targets.

What we're looking for in the industry itself is to make the investment in its own capability, to use our orders. We will purchase those services.

If the investment community or the industry itself isn't willing to invest in its own capability, why would our investors or the financial markets give money to us to in fact pass through to manufacturers.

That being said, the RLV program and the EELV programs are excellent ways of trying to take government funding and seed a market.

And I guess I have one more second.

The challenge is how can we take it from companies in the commercial sector and combine that with these programs and articulate some more aggressive commercial targets for both of these programs?

Thank you.

Mr. ROHRABACHER. Thank you very much, Mr. Chairman, for setting up the panel here, which shows the evolution we're going through in our industry right now. From the Cold War to post-Cold War, we can see an evolutionary process all the way down the line.

Mr. Dave WELDON. Thank you.

I'd like to now recognize the gentleman from Pennsylvania, Mr. Walker.

Mr. WALKER. Thank you, Mr. Chairman.

Mr. Ebner, on page 4 of your testimony, you talk about the Ukrainian agreement and you say, frankly you believe that this poses a significant unanticipated risk to our investment in the Delta III program.

Can I take it from that that you are not involved in the consultative process that led to the Ukrainian agreement?

Mr. EBNER. Mr. Chairman, we had an opportunity to make some inputs but if you're describing a consultative process, that did not exist. We were not consulted.

Mr. WALKER. What kind of input were you invited to make?

Mr. EBNER. We weren't really invited to make any. We sort of inserted ourselves in the process.

Mr. WALKER. So when you learned that something was going on, you in fact sent some information obviously raising some concerns about this?

Mr. EBNER. That's exactly right.

I don't want to imply that Administration officials were not willing to listen to us. They did not solicit our comments or seek us out.

Mr. WALKER. You volunteered the information?

Mr. EBNER. Rather forcefully.

Mr. WALKER. And obviously then did not get the response you had hoped to the agreement?

Mr. EBNER. That's correct.

Mr. WALKER. Dr. Dailey, was Lockheed Martin part of that consultative process?

Mr. DAILEY. Yes, we were.

Mr. WALKER. How did that come about?

Mr. DAILEY. Over the past three years, Mr. Chairman, we have had somewhere on the order of two dozen meetings with USTR on various launch agreements. These are not meetings just with us, these are meetings with industry. They include launch providers as well as satellite builders.

In those meetings in fact I think at least six times we've had various meetings with USTR on the Ukrainian trade agreement itself, giving our input both as a satellite provider and as a launch provider.

Mr. WALKER. This was prior to the initialling of the agreement?

Mr. DAILEY. Yes, it was.

Mr. WALKER. And at that point, were they in fact telling you what they thought the outlines of the agreement would be so that you could get some idea as to what the impact was going to be?

Mr. DAILEY. Yes. I did not participate in the Ukrainian ones directly. I was more involved in the other ones. But as the other ones were conducted, we did the details on what the numbers were and they asked for our inputs as to such areas as low earth orbit impact and the impact it would have on that particular side of the market.

Mr. WALKER. I assume that your experience in working with the Proton would be useful to them in order to understand the dealings with the Russians as part of that agreement, is that correct?

Mr. DAILEY. Yes, that' really the only active joint venture in the area providing launch services with a foreign entity today. In this case, Khrunichev Industries and VO Energia.

Mr. WALKER. You expressed some concerns, according to your remarks, about the nature of calling these transitional agreements. The transition seems to be all, if I interpret it correctly, a one-way street.

Maybe I'm misinterpreting but we're not allowing sufficient time for our industry to transition while moving into international agreements of a transitional nature.

Is that a legitimate understanding of what you meant to say?

Mr. DAILEY. I think one of the things we observed in the market today is that the vulnerability of the demand side of that market is shown by the recent failures that occurred with Ariane and Long March.

And of course even in the past three years ago with our Atlas vehicles. Those put particular pressure, and we're worrying about the transition being able to support the satellite providers, which is a key part of our business, as you know, Mr. Chairman, very well.

To that extent, we as an industry are trying to keep up, and we have been reinvesting heavily, as I indicated in my testimony. We've invested somewhere on the order of $1.2 billion over the last five or six years in trying to make ourselves competitive.

We continue to invest in programs like RLV to ensure we remain competitive.

Mr. WALKER. Thank you.

Mr. Montanaro, was Teledesic involved in the consultative process with regard to the Ukrainian agreement?

Mr. MONTANARO. I don't believe we were directly involved. I believe we made some inputs.

Mr. WALKER. You made some inputs based upon volunteering information on your own, or based upon the Trade Office being in touch with you?

Mr. MONTANARO. I guess so. I'd need to check that.

Mr. WALKER. Would you check that, and supply that for the record?

Mr. MONTANARO. Yes.

Mr. WALKER. The three gentlemen before us who are looking at building a launch capability, were any of you consulted as a part of the consultative process on the Ukrainian agreement?

Mr. O'CONNOR. In the case of Florida, we saw the press articles concerning the potential for this agreement. We expressed our concerns to the Administration and the Trade Representatives Office.

We thought it would be detrimental to some of the newly declared investments in new launch vehicles such as McDonnell Douglas had indicated, as well as the improved Atlas system.

Mr. WALKER. Could I just get a response for the record from Mr. Ladner and Mr. Smith?

Mr. LADNER. No, we were not.

Mr. SMITH. We were informed by McDonnell Douglas of the potential impact and subsequently contacted an interagency working group and requested a meeting which was held on the 29th of November, which delayed the actual agreement from the 14th of November to the December time period when it was signed.

We were somewhat chastised for coming in as late as we did, and we responded that we had had no prior information on this agreement and we voiced our concerns, as I pointed out in our record.

Mr. WALKER. Thank you, Mr. Chairman.

Mr. Dave WELDON. The gentlelady from Texas, Ms. Jackson-Lee.

Ms. JACKSON LEE. I believe you have another party to go before my turn.

Mr. Dave WELDON. Mrs. Seastrand?

Mrs. SEASTRAND. To Mr. Smith.

I know you have strong support for NASA and great cooperation with the Air Force. I know in the past, you've asked for congressional support for NASA developing a cheap recovery vehicle for the X-33 program to support the development of manufacturing satellites in low earth orbit.

I would like you to expand on that.

Mr. SMITH. Thank you, Congresswoman Seastrand.

We have determined, over the past ten years, that a large number of polar orbiting satellites will be developed, over a thousand over the next ten years will be launched in high inclination orbits.

There's a unique aspect of low orbit called sun synchronicity. If you achieve this orbit, you have 24 hours a day of sunshine. You don't have to carry up a large load of batteries to perform your operations during nighttime. You can cut the solar panels in half because you're not charging batteries, etcetera.

So we believe, and with the work at Stanford and other institutions and especially in the Silicon Valley, that there will be a highly developed, automated manufacturing process that will try to achieve polar orbit.

We have a problem. We have no recovery system from polar orbit. The only recovery system in existence today is the shuttle in equatorial orbit.

We believe that the X-33 program would be the ideal program to test a thermal protection system, which the RLV will need, and we

in turn would need for a very cheap recovery vehicle for any manufactured goods out of polar orbit.

Mrs. SEASTRAND. Thank you.

Mr. Dave WELDON. I thank all of you for coming today. Testimony has been very helpful. Please be advised that Subcommittee members may request additional information and questions for the witnesses in writing, which will be submitted for the record.

Ms. JACKSON LEE. Mr. Chairman, I'm here. May I be able to speak, please?

Mr. Dave WELDON. Great, you're back.

Ms. JACKSON LEE. First of all, to the gentlemen in the previous panel, let me apologize for not being here earlier. I nearly missed a markup and I have to go back to the other committee. I thought in a moment we had a vote.

But I'm coming from Houston, I am very much interested in this issue and I understand we've had some interesting discussions.

Let me say that this might not be a question that can be answered, and I would probably offer to say why don't we just have this submitted in writing.

I was going to give this to you, Dr. Dailey, if you want to take a stab at it, but I'm going to secure it in writing, and that is the willingness of your company to provide confidential proprietary business data to the U.S. Trade Representative if you knew it would be shared with Congress?

We're in a very sensitive time, I recognize, and we realize that we are in partnership now with the private sector on these issues, and I think we have to be cognizant of what may be positive and negative in moving forward.

I think this is certainly a large aspect of commercial involvement in this whole space business, certainly dealing with launch strategy.

So I would offer that to you, if you want to comment very briefly, or else I would like to see some response in writing.

Do you wish to comment?

Mr. DAILEY. Thank you, Congresswoman Jackson Lee, for the question.

Obviously, this is of great concern to us because this data is highly competitive in the market and could result in hundreds of millions of dollars of losses in contracts to us.

We protect this as much as we protect classified information within the government in order to remain competitive.

We do submit the data to USTR. We'll have to think about the implications of that and how it would be protected, so I'd like to take that into consideration if I might, and get back to you on it.

Ms. JACKSON LEE. I appreciate that. You do have my empathy on the matter.

We were just recently, in judiciary, dealing with expanding the time for research companies to apply for a patent to 18 months, because that industry has indicated, as the biomedical research and other technologies have indicated, extreme difficulties in refining their research and then having to apply for a patent in the limited time when that research is not finalized and that they are completely comfortable with it.

So it is a large issue for me, and I would be interested in that.

Let me conclude my questions. Mr. Chairman, I'd ask unanimous consent to submit my statement for the record, my opening statement for the record and appreciate very much this area. I think it's a very important one.

Mr. Dave WELDON. Without objection.

Ms. JACKSON LEE. The question that I have goes back to a longstanding point I've consistently made whenever we are involved in the Science Committee in determining what the work will be for the 21st century.

My remarks are that this business, this industry, this space business, while I am a strong supporter of the space station and science, will in fact be the work of the 21st century. As we entered into the 20th century as the chief leader in manufacturing, and hard industry, as I call it, I think what we're doing now will be the work of the 21st century.

Might I get from anyone who would wish to comment the kind of involvement that you have with minority and women entrepreneurs in your particular businesses.

So I would ask Dr. Dailey, Dr. Ebner, Mr. Montanaro, if you would all answer those questions for me respectively.

Mr. O'Connor, Mr. Ladner, with the Alaska aerospace, and Mr. Smith, then I yield back.

Mr. DAILEY. We'll be glad to provide you with all the details of it, but I can tell you that we have a very aggressive program in which we do support such entrepreneurial activities.

We'd be glad to provide you with that data for the record if you'd like.

Ms. JACKSON LEE. I would, thank you.

Mr. EBNER. I have a similar response. We'll provide you the data for the record, if we may.

Mr. MONTANARO. Congresswoman Lee, we share your conviction about the work of the 21st century. We are still a very, very small company and do not have many external relationships. I will submit something for the record also. Thank you.

Ms. JACKSON LEE. Thank you.

If anyone would care to speak on the record, I'd appreciate it too.

Mr. O'CONNOR. Representing state government and the Spaceport Florida Authority, we use all of our normal state processes to encourage minority participation in all of our contracts and subcontracts. We have a very complete, I believe, integration of minorities into our space program activity.

Ms. JACKSON LEE. Is that Mr. O'Connor? I'm sorry, Florida?

Mr. LADNER. As you may know, Alaska, the largest minority group are native Alaskans. Alaska Aerospace, even though it's been in existence since '91, the spaceport as well as the ground stations are in the development stage, so we are actively working to include the native corporations as well as women-owned and so forth. So that's in our planning stages.

Ms. JACKSON LEE. Thank you.

Mr. SMITH. I'm Don Smith, California Spaceport Authority.

My wife is a native American, and president of a small company that has been the sole support of myself while I created the California Spaceport Authority.

[Laughter.]

Ms. JACKSON LEE. Then I know you speak truthfully and know of what you speak.

Mr. SMITH. I would not be here today if it weren't for her working and providing the funds for us to start this non-profit. There are not many fools in the world who will invest in a non-profit corporation, but she did.

Ms. JACKSON LEE. Thank you very much, Mr. Chairman. I thank you for your indulgence and I thank you, the panelists, for those responses, and I look forward to your submitting your information to this record, but I'd also appreciate it to my office.

Thank you.

Mr. Dave WELDON. I want to again thank the witnesses for being here today and again reiterate that members may request additional information in writing.

And I would just like to point out to Mr. Dailey, the information we were requesting is called for in the launch agreements that were signed.

The meeting is now adjourned.

[Whereupon, at 1:25 p.m., Wednesday, June 12, 1996, the Committee was adjourned.]

[The following material was received for the record:]

Testimony by Robert G. Minor, President,
Space Systems Division, Rockwell International
For the Subcommittee on Space & Aeronautics
Committee on Science
U.S. House of Representatives
June 12, 1996

Mr. Chairman and Members of the Subcommittee, I am pleased to have this opportunity to present the views of Rockwell International on the subject of U.S. competitiveness in the increasingly important arena of access to space. Space has been of growing importance to the world's endeavors and economy since Sputnik, and we see that trend continuing well into the future. It is vital that the United States continue a leading role in space access, space exploration, and space utilization. This role is by no means guaranteed, however, due to increasing global competition.

Rockwell's Space Systems Division is proud to have made major contributions to our nation's accomplishments in space. We developed and produced the X-15 rocket plane that set many world speed and altitude records; the Command and Service modules for the Apollo lunar program; the second stage for the Saturn V rocket that propelled humans to the moon; the current Global Positioning System satellite constellation that is revolutionizing global navigation; and the world's first reusable space launch vehicle -- the Space Shuttle Orbiter; among other accomplishments. During this same period of time, our sister division, Rocketdyne, has been at the forefront in the development of both expendable and reusable liquid fuel rocket propulsion systems. These space achievements have honored our nation and have changed our world.

It is clear that reusable space transportation systems will continue to have a vital role in the world's space future, along with expendable launch systems. Payloads will continue to require both launching and return to Earth. People will need to travel to and from space. A growing agenda of space activities, many not yet foreseen, will need to be accomplished. Some of these activities will require long duration in orbit and human attention. Additionally, it is clear that economics favors reusable over expendable hardware for a large percentage of payloads. Further, it is also clear that the Space Shuttle, the world's first reusable space transportation system, will eventually need to be replaced.

The commercial use of space is growing. Revenues and profits from the international commercial space market are increasing each year, as people and companies find increased benefits from space-delivered services. This marketplace has applicability to virtually every person on Earth and is highly technology-oriented in the production and delivery of customer products. U.S. companies hold a leadership position in most of these developing new space-based markets. But this leadership position will become increasingly threatened

Rockwell has been involved with the commercial space market for many years. We now offer a variety of products to service this market, ranging from satellites and satellite navigators, to ground stations and mobile communications terminals.

This market is dependent on the presence of routine, reliable, and cost-effective space transportation services. And while the number of commercial and international satellites to be launched each year may fluctuate, the number of satellites launched is increasing due to growth in the use of space for telecommunications, broadcast services, mobile communications, remote sensing, navigation, and other purposes.

The U.S. market share for commercial and international space launch services has declined over the past two decades, however. Part of this decline results from little investment in new space transportation services, and part has been the effect of increased international competition for launch services. We now see competitors to U.S. expendable launch vehicles (ELVs) from Europe, China, Russia, and the Ukraine. Over the next decade we will likely see additional competition from Japan and other countries.

Further, these foreign competitors have been very aggressive -- in some cases even more customer-oriented and focused on capturing market share than their U.S. counterparts. And they have had the full support of their government and industrial partners.

In an increasingly competitive ELV marketplace, we expect to see new space launch vehicles fielded from Europe, China, India, Russia, and the Ukraine over the next decade. These advances are being matched to some extent by the Atlas IIAR and Delta III vehicles, and potentially by the USAF EELV. But U.S. firms are being outspent by foreign governments, which see expendable launch vehicles as a key technology for competitiveness. Accordingly, the U.S. should not lose sight of improvements that may need to be made in our expendable vehicles.

We believe U.S. companies, competing on a fair and level playing field, can offer products and services that are clearly equal, if not better than our international competitors. However, we have concerns about ongoing foreign government support for space transportation technologies, and continuing unmatched investment by foreign governments in space transportation systems and their supporting infrastructure.

From a government policy viewpoint, we believe the U.S. has three fundamental choices:

- ***Remain with current space transportation systems.*** Under this option, any upgrades to U.S. commercial launch systems would be paid for by the US industry, and the U.S. government would concentrate on only procuring new systems required to meet unique government needs.

We do not support this policy option, as it continues the status quo for U.S. competitiveness in international space launch services. Foreign ELVs will increase their competitiveness, and while U.S. satellite suppliers may maintain a lead in other areas of commercial space activities, these U.S companies will be attracted to overseas space transportation services for their launches.

- ***Support U.S. commercial launch vehicles with some investments for technology development and system upgrades.*** This option would ensure U.S. firms remain competitive against foreign systems that have been the recipient of foreign government-sponsored technology and investments. U.S. government users would be encouraged to utilize these new upgraded systems, and the U.S. government should be able to recoup its investment through better and lower-cost launch services.

  While this policy option may improve the current situation regarding international launch vehicle competitiveness, it only maintains a level playing field. The rules of the game would remain the same, and U.S. firms would not be given a decisive competitive advantage.

- ***Leapfrog the international competition.*** In this option, the U.S. would leapfrog all existing expendable launch systems by supporting the development of a new commercially-oriented reusable space transportation system.

  While this option may be more expensive than the others, it holds by far the most promise for a major positive impact on U.S. competitiveness within the international space launch market. Essentially, this approach changes the rules of the game, exploiting U.S. leadership in reusable launch vehicle technology to recapture the vast majority of the international launch market by changing the paradigm of space transportation. The near-term budgetary impacts that could result from pursuing this option would be offset by substantially decreased costs in the future for all users.

  If emerging technology and available business environments do not support a rapid progression to a completely new commercial system, these new and more efficient technologies could first be incorporated into Space Shuttle and ELV upgrades -- making these systems much more cost-efficient for the period of time that they are still in service.

U.S. firms currently enjoy technological leadership in the field of reusable space transportation. As a nation, we collectively have a technology advantage we believe should be exploited, if we are to regain the high ground of competitiveness for space transportation systems. If we do not act to capitalize on our current advantage, then we may lose our lead. I note the recent Japanese HYFLEX mini-shuttle experiment, and the European FESTIP (Future European Space Transportation Program) as indications our foreign competitors are not going to stand still within the reusable space transportation systems arena.

Time and again, studies of space transportation systems have concluded that the utility, reliability, and low cost offered by fully reusable launch vehicles place them firmly in the world's space future. It is not a question "if" such launch vehicles will be developed, but "when". And our most recent assessments of technical and economic feasibility conclude that the "when" should be "now".

We applaud the current efforts within Congress and NASA in pressing for the development of a commercially viable, next-generation reusable launch system. The government is supporting this goal in its technology thrusts; its planned development of the X-33 technology demonstrator; and its support for the subsequent commercial development of a fully operational single-stage-to-orbit (SSTO) reusable launch vehicle. The plan currently under discussion by government and industry recognizes what is needed for success by a new fully-reusable SSTO is not just new technologies, but a whole new approach to operations and doing business. U.S. space launch competitiveness requires a challenging new combination of government and industry policy and support.

In previous testimony, I pointed out that a primarily commercial Reusable Launch Vehicle (RLV) program is not practical without an appropriate government role in the business environment. In the short-term, the U.S. government will be the largest single customer in the marketplace. For a commercial venture to succeed, the needs of such a dominant player must be well defined and participation assured.

The government also has the important role of developing and enforcing international agreements governing access to space. This includes the double-edged sword of maintaining rules for such things as where rockets can and cannot be launched; the land and water areas over which such vehicles may fly; and the indemnification of citizens and companies that comply with these rules.

The U.S. government also acts as a major developer of key technologies for any commercial reusable launch system. From a commercial standpoint, technical risk reduction (i.e., the X-33) is critical in establishing the basis of the venture. Government and other marketplace needs, coupled with the basic laws of physics of getting to orbit, dictate a high-technology solution. Anything less does not achieve the combined goals of broad capability at dramatically reduced costs; and ensuring the safety of the vehicles and their precious cargo, not the least of which may be human passengers. There is very little market for almost-to-orbit launch vehicles, and no venture will succeed with an unreliable or unsafe system. The X-33 is not just a new vehicle, it is a paradigm breaker in how we will do business in space, in how government and industry must work together for space transportation, and in world opinion held by both financiers and payload customers.

The appropriate government role during the operations phase of the program must be defined. A commercially developed and operated RLV is driven by the marketplace. The near-term commercial market for telecommunications, Earth resources and navigation systems are well known and growing. Government needs are also well known. But we believe new markets will occur if we can offer superior services at substantially reduced

prices. Space endeavors are indeed launch cost elastic (i.e., demands will increase and costs decrease), but the increased demand will occur in the long-run rather than in the short-run. It takes a long time for the new cost/availability situation to be digested, new space ideas to mature, and actual payload hardware to be developed and delivered for launch. Before these new markets can come to fruition, we must rely upon known markets to justify this new venture to our investors and partners. As the largest single customer for space transportation services in the near-term, the US government has a key role.

In a sense, it is like the long-lead situation of the pharmaceutical industry; except that the need for new medicines is obvious, the demographics are very predictable, and the potential for appropriate profit rates are supported by past practice. Space launch has no such history; indeed it has had many setbacks and the financial community is appropriately cautious. Clearly, the winners in the world space launch competition will be those that best chart the course of government/industry relationships.

Rockwell is fully committed to present and future access to space, and is doing many things that further national objectives in this area. We have a major role in the Space Shuttle program, and are undertaking a major effort to reduce costs and increase service, while ensuring the safety of the crew and payload. As the Shuttle continues to evolve, the demonstration of reliable reusable space access will encourage and facilitate the space marketplace. The Shuttle is also a testbed for the RLV; both physically, with deliberate incorporation of SSTO technologies; and operationally, in establishing a lessons-learned basis, pioneering new ways of processing, launching, and turning-around reusable vehicles, and developing new government/industry roles.

Within the X-33/RLV arena, we are devoting our best people and the majority of our discretionary resources toward the development of necessary technologies and designs. We have also enhanced the technological base of the program by harvesting NASP developments, both by capturing key personnel with hard-won experience, and thorough an understanding of the considerable technologies that were developed within that earlier program.

We are convinced that by pursuing the aggressive path we are on towards an operational RLV, and with an appropriate level of support from the Congress and the Administration, the United States will recapture its dominant role in access to space. We believe the convergence of technological progress, commercial development, and a paradigm shift in government/industry roles in space operations give us an exciting business opportunity. Additionally, we believe the RLV will provide the foundation and economies to permit and encourage significant growth in the use and further exploration of outer space.

Mr. Chairman, I thank you for this opportunity to present my views on this important topic.

arianespace inc.

July 2, 1996
DH 96.0232

Chairman F. James Sensenbrenner
Subcommittee on Space and Aeronautics
Committee on Science
U.S. House of Representatives
2332 Rayburn House Office Building
Washington, DC 20515-4909

Dear Mr. Chairman:

Arianespace, Inc. is pleased to have been provided the opportunity to provide a written statement for the record of the June 12, 1996 hearing on U.S. Space Launch Strategy before the House Subcommittee on Space and Aeronautics. A copy of the statement is enclosed.

As the statement describes in detail, it is the view of Arianespace that the international commercial satellite launch market has been profoundly and pervasively affected by the policies and programs of the United States Government. Indeed, they have been far more of an influence on the market than has been any other factor.

The U.S. and European space launch industries have in common their origins in the actions of government. Our industries also enjoy continuing government support. As pointed out by the Department of Defense witness at the June 12 hearing, "...U.S. commercial space launch activity did not actually begin in earnest until the Air Force awarded critical Atlas and Delta launch contracts after the Challenger accident and commercial launch providers could use the Air Force business base to build, process, and launch commercial vehicles at marginal cost. Since 1989, we have been providing extensive support for U.S. commercial launch operators at both Cape Canaveral Air Station and Vandenberg Air Force, all on a marginal cost basis, as directed by National Policy and law." NASA, too, is providing significant support to the U.S. launch industry, most visibly in the reusable launch vehicle technology development program.

These programs and policies have offset, in the case of the American industry, other U.S. Government actions, based upon foreign policy and national security considerations, that have adversely affected both the European and U.S. satellite launch service providers. At the same time, in the important case of the opening of the commercial launch market to the non-market economies, the U.S. satellite providers have benefited where the launch sector has suffered. In view of the relative strength of the satellite and launch sectors, the net result for the United States, from an economic standpoint, has been positive. It is fair to say that, in this field, the impact on European

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commercial space launch interests has not been a source of concern for the United States Government.

As for Arianespace, the challenge has been to adapt to a market environment that has been the scene of repeated, major interventions by the world's most powerful economic and political player. Through determined competition and relying on a strong base of customer satisfaction, Arianespace has been able to gain and hold a place of importance in the international commercial satellite launch market.

With increased penetration of the international market by the NME launch service providers and their U.S.-led joint ventures, competition will doubtless intensify. It is my hope that, perhaps in the not-too-distant future, European and U.S. companies will join forces to meet this challenge. As traditional friends and allies, western Europe and the United States should welcome such a development.

I hope you find something of interest and utility in the enclosed statement. We have also enclosed a copy of an earlier letter sent to Chairman Weldon concerning some of the remarks presented during the hearing. My staff and I are at your disposal for more detailed discussion of these issues if this would be of interest.

Sincerely,

Douglas A. Heydon

Douglas A. Heydon
President

Enclosures:

1. Statement of Douglas Heydon, President, Arianespace, Inc. submitted to the Subcommittee on Space and Aeronautics Committee on Science, United States House of Representatives, related to the June 12, 1996 hearing.
2. Copy of letter dated June 21, 1996 to Chairman Dave Weldon from Douglas Heydon concerning remarks made at the June 12 hearing.

arianespace inc.

June 21, 1996
DH 96.0225

The Honorable Dave Weldon
Vice Chairman
Subcommittee on Space and Aeronautics
Committee on Science
U.S. House of Representatives
216 Cannon House Office Building
Washington, DC 20515-0915

Dear Mr. Chairman:

Thank you for the invitation to submit a prepared statement for the record of the June 12, 1996 hearing before the Subcommittee on Space and Aeronautics on the subject of ***"U.S. Space Launch Strategy."*** Our statement is being prepared and will be submitted in the near future. Arianespace is in agreement with important elements of what was presented and discussed during the hearing, and I believe you will find our statement to be responsive to the broad objectives of your Committee's work.

The need to conserve time during the hearing, by limiting the presentation of each of the many witnesses to five minutes, is understandable, and for the most part they presented their cases in a balanced and forthright way. However, as a more than casually interested observer of this hearing, I feel compelled to respond immediately and directly to remarks made by one of the industry witnesses, Dr. Brian Dailey of the Lockheed Martin Corporation. The choices he made in extracting very selected paragraphs from his prepared statement presented an extremely biased and unbalanced view. I cannot, in good conscience, allow his distorted and misleading comments to go unchallenged.

Dr. Dailey's central tenet is that Lockheed Martin is the "good guy" since it is improving U.S. competitiveness by augmenting the less-than-adequate U.S. domestic space launch capability with Russian Protons and RD180 rocket engines, while Arianespace is the "bad guy" because it continues to attract significant U.S. and foreign business with the European Ariane family of launch vehicles, and the European Space Agency (ESA) does not require repayment of the development costs of this system. From this, he arrives at the conclusion that U.S. launch trade policy should be focused, not on the possible dumping of launch services and launch vehicles by the non-market economy Russians, Ukrainians, and Chinese (as pursued at length by you during the hearing), but on the commercial successes of the market-based European organization. One cannot but wonder if his call for an overall trade framework "..that covers *all* active competitors in the world launch market, specifically including the Europeans" is really intended to apply to Lockheed Martin's Atlas, McDonnell Douglas's Delta and other U.S.-based space launch enterprises, which have their origins in the U.S. Government-funded ballistic missile programs and which continue to benefit greatly from the kind of financial and technical support catalogued so ably by the Department of Defense and NASA witnesses at your hearing. *All* does mean all, does it not?

In this context, I must respond directly to Dr. Dailey's statement that, "...if damage to U.S. interest [sic] is measured by lost business, it would seem that our trade efforts in this area have focused on the wrong player...." I think it reasonable to point out that the U.S. satellite providers, which far outweigh the U.S. launch providers in economic importance, were much less severely affected than they might have been by the loss of access to the Shuttle, following the Challenger disaster, because Ariane was available for commercial launches.

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Dr. Dailey might show a higher regard, not only for the facts, but also for the interests of his customers. He might take into account that the satellite providers were among the most vocal advocates of liberal launch services agreements with Russia, Ukraine, and China, and consequently, would hardly welcome the proposal for the expansion of quotas and pricing constraints to all launch providers.

Perhaps the most egregious of Dr. Dailey's assertions is as follows:"...it is fair to say that this supplier [Arianespace] is the world's most heavily subsidized and has freely pursued its long-standing strategic goal of securing at least 50% of the market, a goal that has been exceeded by 10-15% in any given year." The market share issue is a red herring, as Dr. Dailey well knows. The fact of the matter is that the success of Arianespace over the past decade has been more strongly influenced by a succession of U.S. Government policy actions, suppressing and then resurrecting domestic ELVs, than it has been by any "strategic goal" of the company. Market share is not an end in itself, but is a *result* of prudent business actions in anticipation of, or response to, whatever domestic and foreign policy- and national security-related actions, international economic developments (such as currency devaluations), or other external factors affect a commercial organization's activity.

Dr. Dailey also characterizes the ESA-funded Ariane development program as illustrating "...vividly how some governments go far beyond support of 'development' as it is understood in the US: direct European financial support for commercial Ariane objectives are in the $5-7 billion range officially -- and unofficially as high as $10 billion." One can only assume that he refers to the cumulative ESA development costs for the entire range of Ariane 1-5 programs, including launch infrastructure. The actual amount as documented in ESA annual reports, from 1972 through 1995, is 8.24 billion accounting units. This is an accounting device, roughly equal to the ECU, which has fluctuated over a range of $0.73 - $1.34 during the last 20 years. None of this money is provided to Arianespace in "support for commercial Ariane objectives" which are the sole responsibility of Arianespace. How this differs from "development as it is understood in the US" is difficult to discern. Perhaps we should add up all the launch vehicle and launch infrastructure development funds expended by NASA and the DoD over the past 23 years and see how they compare to this long-term investment by Europe.

The subsidy issue is particularly ironic, in light of the statements made earlier in the testimony at your hearing by the Deputy Undersecretary for Space of the Department of Defense and the Administrator of NASA. These statements provided a litany of the extent and degree of support provided by the U.S. Government to the U.S. launch industry, not only as a consequence of missile development programs, but also through marginal costing of range support, huge infrastructure upgrades, and direct government investment in development programs such as EELV and RLV. The Russian vehicles of Dr. Dailey's partner were developed and have been produced entirely at government expense, and the "privately developed" LLV/LMLV is built around the Peacekeeper-derived Thiokol Castor 120 first stage and IUS, from which the Orbus 21D upper stage is derived. Government funding certainly played a significant role in the availability of these building blocks.

There are appropriate roles for government to play, and neither ESA or Arianespace has ever raised any concerns in this regard. What we are concerned about are representatives of U.S. industry speaking out of both sides of their mouths to public policy makers. In this connection, it must be noted that Dr. Dailey continues to subscribe to the notion that "...unqualified reliance on the U.S. launch industry to meet government mission needs must continue to be the central tenet of U.S. launch policy." If he and his organization are prepared to compete in the world marketplace using Russian-subsidized Proton vehicles, why do they shy away from competition in the protected domestic market?

Dr. Dailey's gratuitous reference to the recent failure of the first flight of Ariane 5 and the February failure of the Chinese Long March 3B, as exacerbating the tight supply of launch capability was certainly selective in the extreme, and more to the point, was simply false so far as Ariane launch services are concerned. Where were the mentions of recent failures of Proton, Soyuz, Delta, Titan IV and the Lockheed Launch Vehicle (now the LMLV)? In the past three years, alone, 12 different launch vehicles have suffered 17 failures. Atlas last failed just four years ago. As regards the availability of Arianespace launch services, one can understand Dr. Dailey's omission of the fact that the Ariane 4 remains unaffected by the Ariane 5

mishap. Indeed, an Ariane 4 successfully launched an INTELSAT VII satellite only eleven days after the Ariane 5 failure. The two systems, including their infrastructure, are independent of one another, and in accordance with long-standing plans, the Ariane 4 will continue to be offered for a considerable period of time after the introduction of Ariane 5 into commercial service.

I should like to close this catalog of complaint with the observation that I was both shocked and surprised at the tone and casual disregard for the facts displayed in Dr. Dailey's statement. It is my belief that professionals can hold very different views on a subject of common interest without resorting to distortion of fact and attack to make a point. I have had many exchanges of views on these subjects with senior members of Martin Marietta management over the years preceding the merger into Lockheed Martin, including on several occasions with Norman Augustine. While we often have differing views, they have been treated in a civil and professional manner, and my respect for individuals such as Mr. Augustine and many others with whom I have been acquainted is undiminished.

Mr. Chairman, you will see from the tone and content of our prepared statement that Arianespace is not seeking to influence U.S. launch policy in any particular direction. What we have attempted to do is to demonstrate the enormously important role played in the international launch services market by the policy decisions and actions of the U.S. Government. Serious players in this market -- and we are serious about maintaining our presence in it -- must be able to adapt and respond to the dynamics created by forces of all types, whether these are new entrants, government policy shifts, currency exchange rate volatility, or others too numerous to name. Our objective is to compete vigorously for each commercial opportunity that fits our capability. Recognizing the influence of government on the market, we feel compelled to keep the record straight in the public policy arena.

Thank you, Mr. Chairman, for offering Arianespace the opportunity to comment on the subject matter of the hearing, and to submit a formal statement for the record. If you, other Members, or any of the staff have questions or would like further information on our position and views, we are at your disposal.

Sincerely,

Douglas A. Heydon
President

cc:

Chairman Robert S. Walker
Congressman George E. Brown, Jr., Ranking Minority Member
Chairman F. James Sensenbrenner
Congressman Ralph M. Hall, Ranking Minority Member
Mr. Norman Augustine
Dr. Brian Dailey

Statement of

Douglas Heydon, President

Arianespace, Inc.

Subcommittee on Space and Aeronautics Committee on Science

United States House of Representatives

June 12, 1996

Mr. Chairman, Members of the Committee :

On behalf of Arianespace, I am providing this statement for inclusion in the record of your hearing on the subject, "U.S. Space Launch Strategy". For the record, I also state that Arianespace, Inc. is registered with the Department of Justice, Washington, D.C. under the Foreign Agents Registration Act as an agent of Arianespace S.A., Evry, France. This material is filed with the Department of Justice where the required registration statement is available for public inspection. Registration does not indicate approval of the contents of this document by the United States Government.

I will focus principally on bilateral commercial satellite launch trade agreements between the United States and Russia, Ukraine, and the Peoples Republic of China, and on relevant policies, laws, and administrative decisions of the United States Government. These are the factors that, by far, have most contributed to the structure and conditions of the international commercial satellite launch market, in which Arianespace has done business since 1981.

Arianespace is a European, multinational private stock company headquartered in Evry, France.. The 53 shareholders include 41 of the leading European aerospace manufacturers from 12 nations, as well as 11 major European banks, and the French

space agency, CNES. The company was founded in March, 1980, and conducted its first commercial launch (the U.S. satellite Spacenet 1 for the GTE Spacenet company), on May 22, 1984. In the 78 launches conducted during the intervening 12 years, we have successfully placed into transfer orbit 111 large satellites for commercial, international, and government organizations, in addition to 26 small auxiliary payloads, or "microsats", for the experimental programs of academia, industry, and government.

Over this same period, the capability of the Ariane family of launch vehicles has continuously been improved, from the initial Ariane 1 performance of about 1.8 metric tons (just under 4,000 pounds) into transfer orbit, to the current Ariane 44L capability of over 4.7 metric tons (well over 10,000 pounds). This very robust capability will soon be even further augmented with the commercial introduction of the new Ariane 5 launch vehicle. At its initiation into commercial service in 1997, the performance capability of the Ariane system will jump to 6.8 metric tons (almost 15,000 pounds) into transfer orbit. Performance enhancements for Ariane 5 are already under development, with the objective of a transfer orbit capability of 8.0 metric tons (over 17,500 pounds) shortly after the turn of the century.

Ariane 5 is a truly "clean sheet" launch vehicle design, incorporating a new large cryogenic engine and other advanced technology, drawing upon the experience gained during the more than 20 years of the Ariane program. The entire design effort has been cost and reliability driven. While the Ariane 5 program was primarily intended to upgrade Europe's independent heavy-lift capability to LEO, it is also a direct response to the increasingly demanding and competitive commercial environment. These drivers are also evident in the entirely new solid booster manufacturing plant and complete integrate-transfer-launch facilities at the launch base in Kourou, French Guiana. The product will be another major step in providing state-of-the-art, user friendly launch facilities that simplify the process of achieving the ultimate goal of any launch service -- the safe, reliable, cost-effective transportation of a valuable asset to its place in space.

The continuing performance improvements to the Ariane system have been motivated by the demands of the commercial communications satellite industry. Satellite builders and operators have always known that the economies of scale have dramatic impact on the communications capability of a satellite. The marginal cost of adding a few transponders to a spacecraft bus, where all the control and "housekeeping" functions already exist, delivers a very substantial return in revenues. The result has been an inexorable growth in the average size and lift-off mass of these satellites, from an average of about 1,600 kilograms (3,500 pounds) ten years ago, to a current average of about 2,400 kilograms (5,300 pounds), and a projected average of 3,200 kilograms (over 7,000 pounds) by the end of the decade. Today, we are regularly launching satellites in excess of 4.2 metric tons (well over 9,000 pounds), and are bidding on launch proposals for satellites approaching the five ton class. The need for launch capacity of the Ariane 5 class, and even higher, is clear, and we are taking the steps to respond to this need.

The first demonstration flight of the Ariane 5, which took place on June 4, was a failure. A detailed, and fully transparent investigation is underway. Preliminary indications are that a computer software error caused the loss of the vehicle and its non-commercial, scientific payload. By their very nature, demonstration flights of new systems are riskier than are the commercial launches of mature vehicles. Nevertheless, risk is always present, as has been amply demonstrated by the 17 failures in just the past three years of 12 different launch vehicles, both newly developed as well as older and proven systems:

Ariane 4	2
Ariane 5	1
Conestoga	1
Cosmos	1
Delta	1
Lockheed Launch Vehicle	1
Long March	2
Pegasus	3
Proton	2
Soyuz	1
START	1
Titan IV	1

As can easily be seen, the risk of failure in this highly complex business does not respect national boundaries, experience level, or company reputation. The commitment of Arianespace and the European Space Agency to Ariane 5 remains unchanged, and we look forward to entry of the vehicle into commercial service, following completion of the requisite testing. In the meantime, the autonomous launch capability of Ariane 4 will be unaffected, and will be utilized through the long-planned transition to Ariane 5. Ariane 4 flight V87 successfully carried an INTELSAT VII series satellite to orbit on June 15.

Much has been said in recent years about "market share", with an accompanying chorus of lament about the losses in this area by the U.S. launch industry from its once dominant, monopoly position of the 1970s and early 1980s. Putting aside for the moment the observation that the present market position of the U.S. launch industry is the inevitable result of the policy decisions taken during this period by the U.S. Government, it should be pointed out that market share, per se, is not a primary business objective of Arianespace. Our objective, and that of any well-run business, is to operate near full capacity, where efficiency is greatest and profitability correspondingly better. Market share is the result of the degree to which any enterprise is capable of meeting the needs and demands of its customers. The historical fact that Arianespace has attracted 50-60% of the commercially accessible launch market is the result of our demonstrated ability to meet those needs and demands, and more recently, to adapt and improve our manufacturing and operational capabilities to offer more launches per year, with the interval between launches shortened to as little as three weeks.

Our continuing study of market trends and demand projections has convinced us that, contrary to other projections as recent as last year, the demand will continue to grow. This conclusion has resulted in direct action: ten additional Ariane 4 launch vehicles have been ordered from our industrial team, to carry payloads well into 1999, during the transition to Ariane 5. In addition, Ariane 5 production itself will be slightly accelerated. The initial production order of 14 Ariane 5s will soon be followed by a large order for 50

more. Arianespace is committed to providing long-term capability on which our customers can and do depend -- with no concerns about political or economic instability to undermine confidence in achieving their business goals, a point which I shall further develop in this statement.

This confidence of Arianespace in the future might seem surprising, in light of the already demonstrated impact on the launch services market of the admission of the non-market economy ("NME") players, Russia, Ukraine, and China, through the mechanism of bilateral agreements with the United States. It has already become clear that the ability of these NME launch service providers to establish prices that are not cost-based has a marked effect on the price expectations of many customers in this field. Consequently, we expect that there will continue to be strong downward pressure on price. In the case of European providers, the adverse effect of this pressure is exacerbated by the continuing loss of strength of the U.S. dollar, the operative currency in international space business.

Nonetheless, there are, and will continue to be, discriminating operators of costly, complex space systems, who attach a high priority to reliability, safety, dependability, and the simple assurance of "being there," and who thus make procurement decisions based on a range of factors, and not on price alone. It is this group of customers whom Arianespace seeks to serve, and we are confident that sufficient business will continue to emanate from such a base that our operating efficiency will remain sound, even in the face of supply and demand distortions introduced by the entry of the NME service providers encouraged by the United States Government.

I observed at the outset of this statement that the structure and conditions of the international commercial space launch market are attributable primarily to a long succession of U.S. Government interventions. Foreign policy and national security interests of the United States have been the principal drivers for those actions. Most recently, the interest in achieving cost economies for the Government in the space launch field has also been an important factor. At all times, U.S. commercial interests have been

subordinate. In most important instances, though not in all cases, the affected interests of European traditional friends and allies of the United States have received little or no consideration. Indeed, U.S. partners of Russian launch vehicle producers and launch service suppliers have promoted an increasingly liberal commercial market access regime for the NMEs, on the argument that the adverse impact will be experienced principally by Arianespace.

The bilateral agreements of the United States with Russia, Ukraine, and China on access to the international space launch market are prime examples of the subordination of domestic commercial space launch interests to U.S. foreign policy and national security objectives. Nonproliferation of ballistic missile technologies, and economic and political stabilization of Russia and Ukraine, as well as "constructive engagement" and expanded trade with China, are among the goals promoted by these agreements. Commitments by the foreign parties to compliance with the Missile Technology Control Regime are preconditions to these agreements, pursuant to which those parties gain the opportunity for economic benefit from the right to launch western satellites that are subject to U.S. export controls.

The United States has negotiated and concluded these agreements against the strong objections of several American aerospace companies, including one that is a major launch vehicle manufacturer and launch service supplier. Moreover, the agreements have been concluded without the concurrence of traditional friends and allies in Europe, and without regard to the western European space launch provider.

Although the commercial impact of these agreements is reasonably obvious, their full significance is understood only in historical context. They are important influences on a market that has been repeatedly and decisively affected by the series of U.S. Government actions over several decades. A review of the more significant of those actions is instructive.

- Development of expendable launch vehicles by the United States for national security purposes. Titan, Atlas, and Delta are among those vehicles which were developed for defense purposes, and have since been adapted to the launch of commercial satellites.

- Utilization of NASA as an asset in the Cold War space competition.

- Abandonment of all U.S. expendable launch vehicles, in favor of the Space Shuttle as the "space truck" to satisfy all military, civil, and commercial requirements for access to orbit.

- Establishment of a restrictive use policy for Shuttle, and return to major reliance on ELVs, in the wake of the Challenger tragedy.

- Establishment of a policy requiring the use of U.S. launch vehicles for all U.S. Government payloads (subject only to limited waiver authority).

- Establishment of satellite export controls for national security purposes.

- Establishment of satellite export sanctions as enforcement tools in support of non-proliferation laws, policies, and agreements.

- Promotion of U.S. aerospace industry consolidation to provide cost economies to the U.S. Government and preserve a healthy defense industrial base.

- Promotion of U.S.-Russian and U.S.-Ukrainian joint ventures for the purpose of contributing to economic and political stabilization and transition toward market economies of our former Cold War adversaries, and in the interest of curtailing the flow of missile scientists and technicians from those countries to others.

- Development of an evolved expendable launch vehicle, the "EELV", primarily to meet national security requirements at reduced cost, and secondarily to serve civil and commercial purposes.

- Promotion of the use of Russian technologies and components in modernized U.S. launch vehicles, including the government-funded EELV, in order to reduce costs, assist Russia politically and economically, and stem the flow of missile expertise out of that country, subject to conditions and restrictions calculated to protect U.S. access to space and the domestic space industrial base.

- Development, with the aid of government technology risk reduction funding, of reusable launch vehicles, "RLVs", to meet all or most future military, civil, and commercial requirements, with the goal of improved performance at greatly reduced costs.

- Authorization of foreign participation in the RLV programs to achieve U.S. technical and financial goals, subject to elaborate conditions and restrictions intended to protect any competitive advantage secured by the United States through the program.

- Authorization of the use of retired, military ballistic missiles for certain non-military purposes.

Thus, U.S. Government actions have variously affected the domestic industry. The very origins of the American space launch industry are traceable to U.S. Government programs and policies. In recent years, foreign policy decisions adversely affecting the U.S. and European launch industries have been somewhat offset -- in the case of U.S. industry -- by direct and indirect U.S. Government financial and technical support. This fact is reflected in testimony of the Deputy Under Secretary of Defense before this Subcommittee:

"...U.S. commercial space launch activity did not actually begin in earnest until the Air Force awarded critical Atlas and Delta launch contracts after the Challenger accident and commercial launch providers could use the Air Force business base to build, process, and launch commercial vehicles at marginal cost. Since 1989, we have been providing extensive support for U.S. commercial launch operators at both Cape Canaveral Air [Force] Station and Vandenberg Air Force Base, all on a marginal cost basis, as directed by National Policy and law. That is, we only charge commercial users what it costs to provide support."

"DoD has a long and successful history supporting commercial space launch activities at our active launch bases. We played a pivotal role in enabling the U.S. commercial launch industry to get started. We are proud of the stewardship we have provided for the U.S. Space launch infrastructure that has been so essential to enabling the U.S. commercial space launch industry to compete successfully in the world market. We are making additional investments for the future to further improve the competitiveness of the U.S. commercial space launch industry -- including $750 million for Range Standardizatioin and Automation and $2 billion for EELV."

Examples of Air Force "stewardship" of the U.S. commercial space launch industry cited by the Under Secretary include:

1. operations and maintenance activities, at a cost of $30 million per year, for government Atlas and Delta programs, "most of which benefits commercial activities using the same processing facilities and launch pads";

2. Planned expenditure of $2 billion over ten years "for the express purpose of reducing the cost of U.S. access to space—something that will certainly have major implications for U.S. commercial competitiveness";

3. Provision of access by U.S. commercial launch providers to over $1 billion worth of Department of Defense launch pads, processing facilities, control centers, and associated launch infrastructure—all at marginal cost, without amortizing any of the development costs;

4. Provision of access by U.S. commercial launch providers to range assets that cost the Air Force nearly $240 million per year to operate and maintain, and in which $750 million is being invested over 10 years for "improvements that will be key to supporting even more commercial launches in the future";

5. Provision of services on the part of 5,300 people to provide weather, power, security, safety, communications, civil engineering, and other support functions at the two space launch bases for national security, civil, and commercial missions.

6. In addition, U.S. spaceport development is being stimulated by initial up-front investment in FY 1993 and 1994 provided by the Air Force Dual Use Space Launch Infrastructure Grant Program.

Testimony before this Subcommittee by the NASA Administrator provided a litany of efforts by that agency to support the U.S. commercial space launch industry. Funds for the RLV program are but a single example. Reportedly, NASA will spend approximately $900 million over three years on the contract under which the X-33 demonstration model of an RLV will be developed. NASA is considering tax incentives, loan guarantees, government anchor tenancy, and various other government incentives for U.S. industry to proceed with development of a fully reusable launch vehicle. In addition, it should be noted that launch services purchased by NASA produce revenues to U.S. companies in the hundreds of millions of dollars annually. As in the case of Defense Department launches, NASA missions are available only to U.S. launch providers.

While U.S. foreign policy has led to agreements that have harmed the market position of wholly domestic launch companies, it has aided the U.S. companies that have sought to sell goods and services to Russia or have entered into business arrangements with Russian enterprises. The May 27, 1996 issue of ***Aviation Week & Space Technology*** carried an article detailing U.S. Government assistance to American exporters. Most interestingly, according to that report, "about 30 U.S. government personnel in 17 embassies and stations throughout Europe recently coordinated efforts to support a Lockheed Martin/ILS bid in competition with Arianespace". Notably, the National Export Strategy, Third Annual Report to the United States Congress from the Department of Commerce, October 1995, describes the breadth and depth of this sort of export assistance activity throughout the world.

The FY 1996 October 1995-March 1996 Quarterly Report, U.S. Government Assistance to and Cooperative Activities with the New Independent States of the Former Soviet Union, prepared by the Department of State, details the exceedingly high level of support provided to Russia and Ukraine by the United States, since the collapse of the Soviet Union. According to that report, as of the end of FY 1995, cumulative appropriations for the Freedom Support Act, Cooperative Threat Reduction (Nunn-Lugar) and selected other assistance and cooperative programs totaled $8.05 billion, of which $7.3 billion had been obligated and $5.1 billion had been expended. Obligations increased by $2.2 billion in FY 1995, while expenditures increased by approximately $1.8 billion. Russia and Ukraine, by far, benefited the most from this support.

However, in its most recent analysis of support for the NIS, the ***New York Times*** found that, from the end of 1991 through September 1995, the United States had obligated $15 billion to the NIS, of which $8.7 billion was in the form of aid (Russia having received approximately $3 billion), and $6.3 billion was in credits ($4 billion having been the Russian share). According to that same report, more than 30 federal agencies run more than 130 programs in the former Soviet Union, and the U.S. has pushed the IMF to grant Russia more than $17 billion in loans to promote economic

restructuring and anti-inflationary budgets. Although these infusions are on the decline, the fact remains that the United States has poured economic assistance into Russia and Ukraine. There can be no question that this has been of value to both countries in maintaining their space industrial bases and, in the case of Russia, a space launch infrastructure. This surely has contributed, in a profound way, to the competitiveness of both Russia and Ukraine, and their U.S. partners, in the international satellite launch market.

Viewed in light of these facts, it is difficult seriously to entertain the notion that European government support for Arianespace explains the past, present, and future competitive environment for international commercial satellite launches. The reality of the matter is that, by comparison to U.S. Government interventions, European government actions have been quite few in number and very minor in scope. By any fair assessment, the continued commercial success of Arianespace has been overwhelmingly a function of the company's adaptability to a market massively influenced by U.S. Government actions, and of our ability to retain the loyalty of our international customers in the face of increased competition. To this analysis should be added the fact that NME launch service competitors in the international market have been provided with vehicles and related capabilities by the Russian, Ukrainian, and Chinese Governments. These subsidies are on an unparalleled scale, and they directly benefit the U.S. partners of both the Russian and Ukrainian launch enterprises. By way of example, Lockheed Martin, through its joint venture with Russian enterprises, International Launch Services, offers commercial launch services on both Atlas and Proton.

I have noted that Lockheed Martin, which has a Russian partner, has argued that any adverse effect on the market from liberalized access to the commercial market for Russian launch service providers would be experienced primarily by Arianespace. However, it is clear that this assertion has not been comforting to another major U.S. company, McDonnell Douglas, which must compete, both in the international commercial market and in the EELV program, without benefit of a Russian partner.

It is important to recognize that the collective competitive challenge posed by the Russians and Ukrainians and their U.S. partners, and to a lesser extent, by the Chinese, will not be easily withstood by any American company that lacks a foreign partner as an asset in the international commercial market, especially if that company ceases to benefit in a major way from the domestic monopoly on access to U.S. Government payloads. It must be remembered that the major U.S. company which has a Russian partner in the international commercial satellite launch market may win the EELV competition, and thus become by far the greatest beneficiary of the domestic U.S. Government satellite launch monopoly. That same company could also win the RLV competition.

It is common knowledge that Europe has in the past sought access to U.S. Government payloads. The U.S. domestic monopoly on launches of those payloads is difficult to ignore; it applies to well over half of the total western launch manifest. Europe has no policy of monopoly on government satellite launches, and in any case, those launches amount to only a small portion of the western manifest. European government satellites have been flown on U.S. launch vehicles.

Today, the EELV and RLV programs provide attractive, though restricted, development opportunities for potential European partners, while European technologies and components can contribute to the U.S. goal of achieving more modern and less costly launch capabilities. One might even envisage arrangements by which Arianespace and a U.S. launch vehicle manufacturer and launch service provider could offer complementary, alternative launch systems and infrastructures based at a U.S. spaceport and Kourou. This truly workable backup system would be very attractive to international customers, and could offset competitive advantages recently won by Russian and Ukrainian launch providers and the consequent loss of launches from U.S. and European facilities. In the meantime, Europe will continue to consolidate and modernize its aerospace industry to achieve important efficiencies and, thereby, become an even more attractive potential U.S. partner. There is ample precedent for work together by the

United States and Europe in the space launch field. For many years, the United States and Europe have both benefited greatly from cooperative development of major weapons systems.

I should acknowledge that there have been press reports of the emergence of a new joint venture, in which Arianespace would market commercial launches by certain Russian vehicles. If such a venture comes to fruition, it will be largely in response to the competitive challenge posed by the entry of NMEs into the international commercial space launch market through the bilateral agreements with the United States, and in answer to the U.S.-Russian and U.S.-Ukrainian commercial joint ventures which have been encouraged by United States policy. Obviously, such a venture would make no sense, if it were not viewed as offering customers a service that they need. In this case, the need for a launch capability suited to smaller payloads would be the target. One may speculate as to whether a U.S.-European joint venture of a similar nature might have emerged in a different U.S. policy environment.

Although I represent a commercial enterprise, the nature of this forum permits me to offer, appropriately, several observations from the policy perspective. It is not difficult to explain why the United States Government has played the preponderant role in the development of the international commercial space launch market. The economic, military, and political power of the United States, the importance of space to the national security and foreign policy of this country, and the linkages of military and civil space with commercial space launch, necessarily make the U.S. Government the dominant player in the international space arena. It is readily conceded that, during the height of the Cold War, the security of western Europe depended very largely upon the achievement of the national security and foreign policy objectives of the United States. And, it is evident that the dissolution of the Soviet Union and the Warsaw Pact has not obviated the need for a strong Atlantic Alliance, in which the United States must be the leading partner. Serious risks to international peace and security have not simply evaporated.

Europe remains the traditional friend and reliable partner of the United States in regional and global affairs. The central importance of this fact is not diminished by the healthy competition that prevails between Europe and the United States in the commercial field. That competition by no means precludes -- and the requirement for mutual security demands -- a continuing, close collaboration of western European and U.S. industries on projects of the utmost sensitivity and consequence in the defense arena. By the same token, a competitive environment does not preclude, and indeed, in appropriate cases, should lead to, collaborative commercial efforts.

Policy makers on both sides of the Atlantic must bear constantly in mind that the U.S. and western European industries have grown and flourished in long-standing environments of free enterprise, and that our economic, political, and social systems share, at their deepest foundations, the fundamental principle of individual liberty. Our partnerships are not the creatures of economic and political experiment and transition. They are not subject to the vagaries of social instability and institutional fragility. They are not vulnerable to violent political or economic paroxysms, nor to shifting strategic politico-military agendas.

These observations are, I concede, at a very high level of abstraction. However, they reflect realities from which practical consequences arise. The critical importance of space launch demands that it be addressed very wisely, never losing sight of those most fundamental considerations which I have sought to address. This is especially true in the United States, where the decisions of government are most critical to the future of international access to space.

Thank you.

National Aeronautics and
Space Administration
Headquarters
Washington, DC 20546-0001

Reply to Attn of:

AUG 9 1996

LB:MDD:LA96-222f

The Honorable F. James Sensenbrenner
Chairman
Subcommittee on Space and Aeronautics
Committee on Science
House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

Enclosed is the edited transcript resulting from the June 12, 1996, hearing at which Administrator Goldin testified concerning the United States Space Launch Strategy. Also, enclosed are responses to written questions submitted by Chrm. Sensenbrenner and Cong. Walker. This material completes the information requested during that hearing.

Sincerely,

Mary D. Kerwin
Deputy Associate Administrator
for Legislative Affairs

Enclosure

Responses to written questions submitted by Cong. Sensenbrenner resulting from the June 12, 1996, hearing.

QUESTION 1:

What are the biggest obstacles in the Reusable Launch Vehicle (RLV) Program?

ANSWER 1:

While no single obstacle appears to dominate in terms of program success, a number of factors could affect the planned program. Among these factors are any decrease in program funding which might cause a stretch in schedule, with resulting significant increases in total program cost; any unanticipated technical hurdle which would produce a stretch in schedule, again forcing costs up due the need to continue paying salaries; or issues arising from the financial markets perception of the riskiness of financing a commercially developed RLV.

QUESTION 2:

Has NASA picked the optimum arrangement to finance the X-33?

ANSWER 2:

It is difficult to say that any particular program financing arrangement is "optimum." The financial arrangements for the X-33 have resulted in a $220 million investment by Lockheed Martin Corporation in the program, with the result that NASA's fixed $941 million investment is "buying" nearly $1.2 billion in technology development. Recognizing that the shareholders of Lockheed Martin are unlikely to see any immediate return of this very large corporate commitment, it is reasonable to suggest that the financing of the X-33 is certainly closer to "optimum" than a purely NASA funded program would have been.

QUESTION 3:

You have stated that in the year 2000, if industry is not willing to move forward and develop an operational RLV, NASA may have to continue with testing technologies.

a: What time constraints are you under, given that one of the goals of the program is to develop a replacement for the Space Shuttle by the year 2012?

ANSWER 3a:

The RLV program is under no time constraint with respect to the potential obsolesce of the Space Shuttle. As I have indicated in previous testimony, the RLV program is a technology development and demonstration effort. It is not tied to the replacement of the Shuttle.

QUESTION 3b:

How long after testing is complete, will it take for industry to develop and operational vehicle?

ANSWER 3b:

Following a decision by one or more companies to invest in development of RLV's, we would expect that such vehicles would be under test within four years and in service within five years of that decision.

QUESTION 3c:

How long will the Space Shuttle last assuming that there is no replacement by 2012?

ANSWER 3c:

Assuming there is no replacement, the Space Shuttle may last with obsolescence upgrades to the year 2030.

QUESTION 4:

Is the Advanced Space Transportation Technologies Program (ASTTP) important to the success of the RLV program? Is it a new start?

ANSWER 4:

The ASTTP program is an effort to initiate work on some of the technologies which might apply to the generation of technology which will follow the development of the first commercial RLV's. While it is not directly related to the RLV program, these technologies could first fly on the X-34 or X-33 vehicles as part of a follow-on flight test effort.

QUESTION 5:

At least one of the current RLV contractors has expressed an interest in launching from Cape Canaveral, Florida.

Does NASA have a position regarding the launch location for the RLV program?

ANSWER 5:

Flight test safety during the X-33 and X-34 programs will be the responsibility of the Government. As such, NASA is involved in the development of appropriate environmental impact and flight safety approaches. NASA, however, has no preference with respect to any particular launch--or landing--location.

QUESTION 6:

Several NASA programs, including Lunar Prospector, are considering the use of Launch Complex 46 as a launch site. That launch complex is being developed by the State of Florida for the use of multiple launch companies that produce "small" launch vehicles.

Does NASA have a position regarding the launch location of small launch vehicles carrying NASA payloads?

ANSWER 6:

No, NASA has no position on launch location.

QUESTION 7:

The "competitiveness" or ability of U.S. launch systems to compete in a global market while meeting government launch requirements depends on at least two factors. First and foremost, the launch vehicle offered by U.S. firms must compete favorably with foreign launch systems. Second, the general operating environment of U.S. launch systems must be attractive and preferred by international launch customers.

The RLV program as presently structured will not deliver an operational commercial launch system by the time the launch trade agreements with the NME's expire. Considering this:

a: What contribution will the RLV program be making to launch competitiveness at that time?

ANSWER 7a:

The RLV program is focused on demonstrating the technology and the operational methodologies that will reduce the cost of access to space. Improving the competitiveness of the American space launch industry is a product of that program focus, and that is the program's contribution to competitiveness.

QUESTION 7b:

Should NASA reconfigure the program to bring the RLV to market sooner in order to be effective in the commercial satellite launch market?

ANSWER 7b:

The RLV program is an extremely fast paced program. While additional funds might bring the X-33 to flight test a little sooner, it seems unlikely that rushing an already aggressive schedule would produce benefits in excess of the risks.

QUESTION 7c:

Can the RLV program contribute to U.S. launch competitiveness in expendable launch systems, even without attaining its ultimate goal of an SSTO launch system?

ANSWER 7c:

With the possible exception of Thermal Protection Systems (TPS), all of the technologies being flight tested in the DC-XA, X-34, and X-33 programs are directly applicable to expendable launch systems.

QUESTION 8:

According to your testimony, NASA is examining the need for some type of incentive for private industry in the form of tax holidays or financial incentives should they prove necessary for full-scale development of an RLV fleet.

At this time, what options are you considering to keep private industry involved with the cooperative agreements and to ensure that a full-scale RLV is realized?

ANSWER 8:

The cooperative agreements are structured so that payments are made upon completion of milestones. To achieve the maximum contribution from the government, the contractor must achieve all the negotiated milestones. Additionally, the sunk costs represented by the contractor's contribution over the life of the agreement incentivizes the company to produce a return on that investment. We continue to solicit inputs from government and the private sector so that we may begin to understand what combination of policy changes and incentives will result in the private development of the RLV.

QUESTION 9:

In your testimony, you also maintain that the government must not be expected to cover all the risks associated with the RLV program.

Specifically, what risks do you feel that NASA should relinquish to private industry and which risks should NASA maintain?

ANSWER 9:

An outcome of the X-33 selection process is that the contractor is assuming the risk of the engine development program, not only for the X-33, but also for the follow-on operational vehicle. That is the kind of risk that I have been asking companies to step forward and undertake. We have never shied away from our responsibility to accomplish research and development, but have tried to get those who stand to benefit from that investment to assume a share of the risk commensurate with the potential rewards.

QUESTION 10:

What do you view as the proper role of government in facilitating the U.S. commercial space launch services business?

ANSWER 10:

The proper role of Government is to procure launch services at the absolute best price available. The best prices now available are too high for everyone, not just the Government. So another proper role for Government is to help reduce those costs and facilitate a marketplace that does not rely solely on the Government for its survival.

QUESTION 11:

Is it more important for U.S. government agencies to get the best price possible to launch their satellites, regardless of the source, or is it more important to use U.S. launch vehicles even if the price is higher?

ANSWER 11:

It is a National policy objective that this country will pursue those technologies that will allow the United States to develop launch capabilities that will dramatically lower the costs associated with space launch. At that time, the other nations of the world will be asking themselves this very question.

QUESTION 12:

Is it important for the United States to maintain its own launch capability? What are the implications of relying on foreign launchers for national security payloads?

ANSWER 12:

I cannot imagine a future in which the United States of America would have no launch capability. I can imagine a future in which our capabilities exceed that of the rest of the world. The details of the impact of relying on foreign launchers for national security payloads are probably better left to other agencies to answer, however, it seems to me to be self-evident that national interests preclude total reliance on foreign suppliers of any critical product or service.

QUESTION 13:

If the federal government retains a substantial role in guaranteeing markets, providing support services, and developing technology, how does that differ from the types of government subsidization of foreign launch service companies about which so many complaints are heard?

ANSWER 13:

All U.S. Government investments in technology development for the RLV program conform to our international treaty obligations with respect to fair international trade.

Responses to written questions submitted by Cong. Walker resulting from the June 12, 1996, hearing.

Ukrainian Launch Trade Agreement:

QUESTION 1:

Please provide the names of the individuals at NASA who were involved in the consultative process with the United States Trade Representative (USTR) on the Ukrainian launch trade agreement.

ANSWER 1:

John R. Dailey, Acting Deputy Administrator, and John D. Schumacher, Associate Administrator for External Relations, attended a Deputies meeting on the Ukrainian agreement on October 30, 1995. Members of the staff of the Office of External Relations participated in the working group meetings led by USTR.

QUESTION 2:

Please provide copies of correspondence, if any, that was sent to and/or from the USTR during consultations regarding the Ukrainian launch agreement.

ANSWER 2:

The USTR sent to the interagency working group on October 5, 1995, a draft of a classified Deputies paper on the geosynchronous (GEO) quota issue. The document listed various options for a Ukrainian launch quota and offered a recommendation. The document was reworked and sent in final to the Deputies in late October in preparation for the October 30, 1995, Deputies meeting.

Other papers concerning issues involved in the Ukrainian agreement, as well as copies of travel cables and other traffic surrounding the negotiations, were forwarded to agencies by the Department of State (OES/STH).

No correspondence was sent from NASA to USTR.

QUESTION 3:

Prior to the signing of the Ukrainian launch trade agreement on February 21, 1996, did NASA convey to the USTR that this agreement would be in the best interest of the United States?

ANSWER 3:

NASA concurred on the subject agreement, finding no areas where the agreement was not in conformance with matters under NASA purview.

NASA has consistently worked to avoid confusion and linkage between U.S.-Ukraine civil space cooperation and the efforts by the Office of the United States Trade Representative (USTR) to negotiate a trade agreement on commercial

space launch. NASA, has on several occasions, worked with other U.S. Government agencies and with the Ukrainian Government to ensure that discussions of civil space cooperation included neither launch vehicle development nor commercial launch services issues.

Consistent with the National Space Transportation Policy (NSTC-4), NASA carries out the civil space program of the United States utilizing Government-sponsored launches, foreign launches on a no exchange of funds basis, and competitively procured U.S. commercial launches. The agency has no direct involvement in trade in international commercial space launch services. In addition, NASA s efforts to reduce the cost of access to space, through X-33 and other programs, are being pursued in partnership with U.S. industry with the objective of advancing technology and reducing risk sufficiently for U.S. industry to develop a next generation of reusable space vehicles.

NASA must remain cognizant of commercial space launch issues pursued by the USTR and other agencies. Nonetheless, consistent with Congressional direction that NASA not be in the commercial space launch business, NASA's role in commercial launch agreement negotiations with other nations is that of an interested observer.

QUESTION 4:

When did NASA approve the final content of the Ukrainian agreement?

ANSWER 4:

NASA neither advocated nor objected to the USTR position on the Ukrainian agreement. NASA concurred on the text of the GEO quota issue at the Deputies meeting on October 30, 1995.

Launch Voucher Demonstration Program

QUESTION 5:

"In accordance with Public Law 102-588, section 504 calls for the Administrator to establish a demonstration program to award vouchers for payment of commercial launch services and payload integration services for the purpose of launching payloads funded by the Office of Commercial Programs". It is my understanding that such a launch recently took place. Public Law 102-588 further requires that the "Administrator shall conduct an ongoing review of the program...and shall...report to Congress the results of such review, together with recommendations for further actions relating to the program".

Could you please supply the Committee with the required report no later than September 5, 1996?

ANSWER 5:

The Office of Space Access and Technology (OSAT) committed to conduct one sounding rocket launch through a voucher recipient as its part of NASA's Launch Voucher program; the remaining five launches were to be conducted through the

Office of Space Science. The University of Alabama at Huntsville Consortium for Materials Development of Space was selected as the voucher recipient. That recipient conducted a competitive launch solicitation, selected the launch firm, and had a successful sounding rocket launch on April 3.

OSAT will provide, through NASA Legislative Affairs, an assessment to Congress of the voucher process and the one sounding rocket launch associated with Office of Space Access and Technology's program by September 5, 1996.

QUESTION 6:

Further, in materials provided to the Committee it was represented that six sounding rocket launch voucher demonstrations would be conducted over a three year period.

What is the current status of the program?

ANSWER 6:

Through an agreement reached between the Office of Space Science (OSS) and the Office of Advanced Concepts and Technologies (OACT), a plan was put together to allow for the demonstration of vouchers. This plan included the flight of one rocket under the auspices of OACT, and the flight of five additional sounding rockets via the OSS program, with the caveat that the normal peer review process for science would not be compromised. OSS additionally requested that all its science divisions consider language in their NASA Research Announcements (NRAs) that acknowledged the desire to solicit volunteers for the launch voucher program through the normal Headquarters-sponsored NRAs. Two cycles of NRAs have been issued to date. However, interest from the science community in volunteering for the voucher program has been minimal over the past two years. About 15% of all proposers showed interest in participating in the program. Unfortunately, none of the interested applicants scored high enough in the science peer review process to qualify for a basic science grant to which the voucher could then be attached.

While we have had a fundamental problem in obtaining qualified proposers to participate in the launch voucher demonstration, we are moving towards congress' objective of commercializing the launch of sounding rockets. We are re-engineering the sounding rocket program and considering transforming the wallops flight facility to a government-owned site.

OFFICE OF THE UNDER SECRETARY OF DEFENSE

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ACQUISITION AND TECHNOLOGY

AUG 09 1996

Honorable F. James Sensenbrenner, Jr.
Chairman, Subcommittee on Space and Aeronautics
House of Representatives
Washington, D.C. 20515-6301

Dear Mr. Chairman:

I have reviewed the transcript from the June 12, 1996 hearing on "U.S. Space Launch Strategy". The changes that I would request be made to the transcript are included in Enclosure 1. I have also provided responses to the additional questions for the record provided by your Subcommittee in Enclosure 2.

Thank you again for the opportunity to testify on this critical national issue and I look forward to working with you and your staff in the future.

Sincerely,

Robert V. Davis
Deputy Under Secretary of Defense for Space

Enclosures

Follow-Up Questions

from

12 Jun 96 House Science Committee Hearing on Spaceports

1. Is it more appropriate for U.S. government to take responsibility for funding range support operations for commercial spaceports, or should the private sector accept responsibility for those activities?

It would not be appropriate for the U.S. government to fund range support operations for commercial spaceports. According to the President's National Space Transportation Policy (PDD/NSTC-4) and the Commercial Space Launch Act (49 U.S.C. § 70111), U.S. government agencies provide launch base and range support for U.S. commercial sector space activities on a direct cost reimbursable basis. Commercial spaceports using U.S. government launch property and services to support U.S. commercial space launch activities currently reimburse government agencies for direct costs. As the commercial launch industry continues to perform the larger portion of the launch operations at government facilities, it would be appropriate for the commercial launch industry to reimburse the government for indirect costs for launch support. However, current regulations and laws do not allow DoD to recover any of the indirect costs associated with launch support.

2. The number of civil and commercial launches (9 of 13) exceeded the number of defense launches in 1995 for the first time. This trend is expected to continue for at least the next decade. As the budget of the Department of Defense continues to decline, will the Air Force be able to continue its support of civil and commercial launches? If so, how might that level of support be affected by further reductions in the defense budget?

Increasing commercial activity and support requirements are shrinking the excess capacity of our launch bases so it's approaching zero. Air Force Space Command's two space launch wings are currently manned, budgeted, and configured to support government mission requirements. They support commercial space activities on a space available, non-interference basis using excess capacity, as directed by National Policy and Federal Law. Federal government agencies do not have the authority to establish capabilities for the sole purpose of supporting commercial space activities.

Follow-Up Questions

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12 Jun 96 House Science Committee Hearing on Spaceports

Increasing commercial space activity is stressing the launch bases with additional work. More than half the space launches from our ranges are commercial and 25 of the 36 new programs introduced at our launch bases in the past two years are commercial. The nature of these new commercial space programs requires higher levels of government involvement than earlier commercial activities using existing Air Force infrastructure. In some cases, new commercial space programs require additional infrastructure, multi-customer use of existing infrastructure, and some are experimental or developmental in nature. These factors all result in increased requirements for planning; safety and operations analysis, environmental approvals, and scheduling with associated demands in financial, legal, and management areas.

Further declines in Air Force budgets or manpower at the launch bases will definitely have an adverse effect on the amount of excess capacity available to support commercial space activities. The consequences of this situation for both government and commercial launch services could be deteriorating facilities and diminished DoD support due to the stretching of resources.

3. Over the long term, how do you expect the Defense Department's procurement of launch capabilities will evolve? Will the Department transition from procuring launch vehicles into procuring launch services?

Our acquisition methods have increasingly relied upon commercial-like practices and performance-based requirements. Consistent with the National Space Transportation Policy, DoD fully supports increased use, wherever appropriate, of commercial services and products instead of continuing to rely on DoD developed, procured, owned, and operated systems. In that regard, we recognize and support an evaluation of the potential for increasing our reliance on commercial launch services. Before making any major changes to our current practices however, we need to address several issues including division of labor, costs, and, most importantly, the ability to maintain assured access to space for DoD payloads in support of national security

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objectives. With the EELV program, we are taking additional steps to make our procurement practices even more commercial-like. For instance, EELV is one of four key Air Force programs implementing a variety of innovative acquisition reforms, including use of a very small program office, and it's one of seven programs approaching cost as an independent variable. We are proud of our efforts to streamline our space launch acquisitions, especially with the EELV program, and we are sure the results of these efforts will be more efficient acquisition programs that meet requirements.

4. The President's policy allows for use of retired ICBMs to launch small payloads into space on a case by case basis and Secretary Perry has just approved the conversion of 5 Minuteman missiles for this purpose.

- **How do you see DoD's use of these retired assets evolving over the next few years?**

Secretary Perry has approved the conversion of up to 5 Minuteman II missiles, but has only approved the use of one of these missiles for launching the Joint Air Force Academy/Weber State University Satellite (JAWSAT). The remaining assets will be assessed on a case by case basis using the guidelines in the National Space Transportation Policy, dated August 5, 1994.

- **Does DoD take any specific steps to consider the possible negative impact that converting ICBMs into space launch vehicles could have on arranging private financing for new commercial space launch vehicles?**

The use of excess ICBM assets for space launch was established to provide for DoD requirements that could not be met by commercial industry on the basis of cost and schedule. In order to minimize the impacts to the commercial launch industry, guidelines were established in the National Space Transportation Policy. These guidelines treat each potential use of excess ICBM assets for space launch on a case-by-case basis. Each proposed utilization must be certified by the requesting agency that the cost and availability of commercial launch services

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will not meet the specific DoD requirement. Since the Department plans its required launches well in advance of the actual launch date, the use of these excess ICBM assets will be minimized, which will minimize the impact to the growing commercial space launch industry.

5. DoD's space launch activities benefit the U.S. commercial launch industry by increasing production runs, reducing unit costs, and providing an infrastructure that the commercial sector can use.

- **Is the reverse also true, that a strong U.S. commercial launch industry benefits U.S. defense capabilities by reducing unit costs and stimulating new investment in launch technologies such as the Lockheed-Martin Launch Vehicle and the Delta 3?**

Absolutely. In fact we anticipate in the near term that the EELV program will demonstrate this relationship, providing cost and efficiency benefits to both commercial and government users.

6. Your testimony laid out (1) the crucial role DoD has played in enabling commercial spaceports to get started and (2) how far along draft guidelines on spaceports are in the interagency review process. Does the Defense Department think it is necessary that these guidelines be completed prior to the establishment of a licensing regime for spaceports?

We understand that the Department of Transportation already has procedures in place to license non-federal launch site operators and that the California Spaceport has already formally applied for such a license. Assuming that development of formal regulations requires a notice of proposed rule making and associated public review procedures, it does not seem possible that formal regulations could be completed before the federal guidelines on federal government interaction with spaceports, which we expect to be completed by the end of the summer. We believe the guidelines, coupled with the procedures DOT already has established, should be sufficient to allow the federal government to both facilitate and regulate spaceports until the formal regulations are published.

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7. Do you see any implications of the Ariane 5's recent failure for the heavy-lift aspects of the EELV program?

I believe that the U.S. commercial satellite industry would agree that a U.S. heavy lift capability would provide multiple ways in which to place future commercial spacecraft into orbit for revenue generation. The Ariane 5 program simply highlights the importance of a heavy lift capability to spacefaring nations.

8. With few exceptions, the trend in satellite technology within NASA and the commercial sector is towards smaller payloads that do not necessarily require heavy lift capabilities. In discussing fiscal years 1996 and 1997 budgets for the intelligence community, House Intelligence Committee Chairman Larry Combest recommended that other government agencies try to exploit this approach as well.

- **How closely is the Defense Department tracking this trend?**

We are tracking civil, commercial, and intelligence sector space launch requirements very closely, but we do not see a trend toward smaller spacecraft obviating the need for future U.S. heavy lift capability. In fact, we see just the opposite. Most of NASA's key launch requirements for the future are tied to Space Station resupply, which requires heavy lift capability. The definitive source of U.S. commercial space launch requirements is the Commercial Space Transportation Advisory Committee (COMSTAC). According to their July 1996 Mission Model update, commercial satellites requiring launch systems to place them into geosynchronous transfer orbits will be growing heavier in the future--to weights that substantially exceed the performance capabilities of the Atlas IIAR and Delta III. Even after the downsizing of intelligence community satellites, they potentially will exceed the performance capabilities of the medium to intermediate class of U.S. launch systems currently under development commercially. While there is an emerging segment of the commercial satellite

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market producing smaller satellites for use in distributed networks in low to medium altitude orbits, the deployment launches planned so far still rely on medium to large class launch systems. Commercial geosynchronous communication satellite systems have recently identified the need for a heavy lift launch capability comparable to Ariane 5. This is due to the costs associated with reserving a geosynchronous orbital slot for their payloads, estimated at $670 million, that will require the satellite to maximize its on-orbit capability, thus increase in size and weight. The EELV system is designed to provide these capabilities while minimizing the cost per pound delivered to orbit.

- **Do you expect the nation's heavy lift requirements to decline in the next few years? If not, why not, given trends towards satellite miniaturization?**

The current projection for DoD heavy lift payloads is approximately 1 every 2-3 years beginning in 2005. I do not expect that to grow considerably based on advancements in technology to reduce satellite size and weight. Commercial GEO communication satellites have continually grown in size and indications are that they will continue to grow. Given this, the commercial heavy lift requirement will probably become a driving factor in the number of heavy lift vehicles launched after 2005.

9. **As you mentioned, the number of commercial launches has recently been greater than the number of DoD launches and this trend may continue for some time.**

- **As the Defense budget declines, will the Air Force be able to continue its support of civil and commercial launches from Cape Canaveral and Vandenberg Air Force Base?**
- **If so, how might that level of support be affected by further reductions in the defense budget?**

Increasing commercial activity and support requirements are shrinking the excess capacity of our launch bases so it's approaching zero. Air Force Space Command's two space launch wings are currently manned, budgeted, and configured to support government mission

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requirements. They support commercial space activities on a space available, non-interference basis using excess capacity, as directed by National Policy and Federal Law. Federal government agencies do not have the authority to establish capabilities for the sole purpose of supporting commercial space activities.

Increasing commercial space activity is stressing the launch bases with additional work. More than half the space launches from our ranges are commercial and 25 of the 36 new programs introduced at our launch bases in the past two years are commercial. The nature of these new commercial space programs requires higher levels of government involvement than early commercial activities using existing Air Force infrastructure. In some cases, new commercial space programs require additional infrastructure, multi-customer use of existing infrastructure, and some are experimental or developmental in nature. These factors all result in increased requirements for planning; safety and operations analysis, environmental approvals, and scheduling--with associated demands in financial, legal, and management areas.

Further declines in Air Force budgets or manpower at the launch bases will definitely have an adverse effect on the amount of excess capacity available to support commercial space activities. The consequences of this situation for both government and commercial launch services could be deteriorating facilities and diminished DoD support due to the stretching of resources.

10. The limiting factor in support of commercial space activities at Cape Canaveral is not facilities or private investment, but instead is government and contractor manpower. How can the nation be assured that sufficient manpower will be provided to continue commercial activities at Cape Canaveral and Vandenberg AFB?

We have been exploring a range of possible solutions to this situation of increasing demands for use of decreasing resources. We are looking into options to seek additional resources to support commercial space activities, contract out more support functions, delegate

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some responsibilities to commercial operators while certifying their processes, or enter cooperative arrangements with the Department of Transportation. We are addressing this area with NASA as part of the interagency working group effort to define guidelines regarding federal government interactions with spaceports. In addition, over time the launch facilities will become more of a limiting factor as the launch mix becomes more predominantly commercial. Currently, however, DoD is prohibited from budgeting to finance replacement and modernization of its facilities used for commercial purposes. It may be appropriate to explore alternatives to address this issue.

11. The Florida Spaceport Authority has recommended that Congress provide support to the commercial space launch industry through the creation of an organization similar to the Coast Guard.

- **Could this be an effective means of ensuring that there is adequate support at Cape Canaveral and Vandenberg?**
- **What do you view as the proper role of government in facilitating the U.S. commercial space launch services business?**

Just creating another federal government organization is not the solution. We already have the Air Force, NASA, and the Department of Transportation involved in regulating commercial space activities from federal ranges. We have been exploring a range of possible solutions to this situation of increasing demands for use of decreasing resources. We are looking into options to seek additional resources to support commercial space activities, contract out more support functions, delegate some responsibilities to commercial operators while certifying their processes, or enter cooperative arrangements with the Department of Transportation. We are addressing this area with NASA as part of the interagency working group effort to define guidelines regarding federal government interactions with spaceports.

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12. Is it more important for U.S. government agencies to get the best price possible to launch their satellites, regardless of the source, or is it more important to use U.S. launch vehicles even if the price is higher?

We recognize the importance of cost effectiveness and we're pursuing significant cost reduction goals through the EELV program. National and DoD policy states that all U.S. government and, therefore, national security payloads will be launched on U.S. launch vehicles. We view the EELV program as an effective means to continue to implement this policy in the future.

13. Is it important for the United States to maintain its own launch capability? What are the implications of relying on foreign launchers for national security payloads?

It is imperative that the United States maintain its own launch capability. Maintaining U.S. launch capability for U.S. government payloads has been a consistent element of Presidential space policy for decades. The basis for this policy is that the U.S. must be able to assure our own access to space to meet national security requirements. If we were to rely on foreign launch systems, we simply could not be assured of our ability to access space. Especially now that we have significantly reduced forward basing of U.S. capabilities, our ability to meet national security objectives would be severely limited without assured access to space for national security missions. Specifically, our ability to provide weather, navigation, communication, warning, and intelligence information to warfighting commanders, National Command Authorities, and other national users would be greatly constrained.

14. If the federal government retains a substantial role in guaranteeing markets, providing support services, and developing technology, how does that differ from the types of

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government subsidization of foreign launch service companies about which so many complaints are heard?

There are big differences between the subsidies provided by the U.S. government to its launch companies versus how foreign governments subsidize their launch industries. We do not guarantee markets nor do we provide direct funding to our space industries through stock purchases. We also do not use the satellite payload to meet commercial and military purposes and we do not regularly subsidize commercial payloads, with LANDSAT being an exception, like foreign governments.

15. Please provide the names of the individuals in your office who were involved in the consultative process with the United States Trade Representative (USTR) on the Ukrainian launch trade agreement.

In the Office of the Secretary of Defense, I was personally involved with the process, as was my boss, the Under Secretary of Defense (Acquisition & Technology), and the Assistant Secretary for Economic Security. In addition, the Assistant Secretary of the Air Force was also involved.

16. Please provide copies of correspondence, if any, that was sent to and/or from the USTR during consultations regarding the Ukrainian launch agreement.

A great deal of the consultation took place during meetings in which no direct written exchange took place. I believe that the Committee has already requested the same information from the USTR, so we will defer to them as the lead agency.

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17. Prior to the signing of the Ukrainian launch trade agreement on February 21, 1996, did DoD convey to the USTR that this agreement would be in the best interest of the United States?

DoD conveyed that it found the agreement to be acceptable.

18. When did DoD approve the final content of the Ukrainian agreement?

DoD approved the final content of the Ukrainian agreement the week of October 30, 1995.

19. In the early 1980s, the Federal government made the Space Shuttle the sole means of access to space for major governmental payloads. In the wake of the Challenger accident, the Department of Defense adopted a "mixed fleet" approach to ensure that it was never dependent on a single launch vehicle to meet its requirements. If the Reusable Launch Vehicle is successfully developed, should the DoD move all of its payloads to that vehicle, or should it maintain the capability to launch on other launch vehicles? Do you envision any circumstances under which the U.S. should abandon the "mixed fleet" approach?

The most prudent approach to assuring access to space is to maintain a mixed fleet of vehicles so a failure of one system can not ground the entire fleet. Even if the U.S. successfully develops and demonstrates a fleet of Reusable Launch Vehicles, I believe the most prudent approach is to maintain assured access to space for national security payloads through a mixed fleet using both reusable and expendable launch vehicles. One primary factor is today the Space Shuttle will not support delivery of certain DoD payloads due to the hazardous environment they provide to the crew. It is unclear as to whether the RLV will eliminate this concern, which leaves the expendable launch vehicles as the primary means for access to space for certain payloads.

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21. Both the DoD and NASA initiatives are aimed at significantly reducing the cost of space transportation. What needs to happen to ensure that the prices charged for that space transportation also are reduced?

One way is to have the government continue to develop and transfer cost reducing technologies to the commercial industry. This will provide the mechanism to continue to reduce the costs, and eliminate/reduce the need for commercial industry to invest capital funds. Primarily though, the price of space launch will be driven by the international market place. Therefore ensuring that U.S. manufactured launch vehicles remain competitive will assist in getting the best possible price for space transportation. It should be remembered, however, that cost does, of course, have major influence on the price the market sets.

FRANK WEAVER

Answers to Questions Submitted for the Record by Mr. Sensenbrenner

Question. The analogy is often made between the operation of commercial spaceports and airports, particularly in terms of what the federal government's role should be in regulating spaceports.

Is this an apt analogy? What are the similarities and differences between airports and spaceports?

Answer. While airports and spaceports are similar in some respects, they serve two very different industries. Airports are concerned with the movement of millions of passengers, as well as cargo, and must account for the safety and security of those passengers. Spaceports, on the other hand, do not handle passenger traffic, but must also ensure safe operations. In both cases, the uniform safety regulation that Federal oversight offers is appropriate.

As you know, launch sites are evolving from federally-operated facilities to non-Federal operations, much like today's airports. The airport/spaceport analogy will become more apt as this evolution continues, as with airports, the Federal government will continue to have an interest in, and oversight of, safe operations at U.S. spaceports. In commercial space launches, issues regarding possible U.S. liability mandate continued federal involvement and oversight as well.

Question. The Commercial Space Launch Act and subsequent regulations governing the U.S. commercial launch industry were drafted in a simpler time when there were no joint ventures between U.S. and foreign countries on marketing launch vehicle services, or discussions of launching foreign vehicles from U.S. territory or U.S. launch vehicles from foreign territory.

Are joint ventures, like Lockheed Martin's arrangements with two Russian companies or Boeing's with Ukrainian and other foreign companies, governed by U.S. regulations?

Answer. Under the Commercial Space Launch Act, if a U.S. citizen conducts a launch, regardless of where that launch is conducted, it must obtain a license from the FAA.

Lockheed Martin's Russian ventures are not subject to FAA licensing because Lockheed Martin is not conducting the launch of the foreign launch vehicle. However, the Sea Launch venture (in which Boeing has an interest) is subject to FAA licensing, because Sea Launch is conducting the launch, and is considered a U.S. citizen for the purposes of the statute.

Question. Do U.S. regulations apply to launches of U.S.-made rockets from foreign launch sites?

Answer. If the launch operator is a U.S. citizen, U.S. launch operator regulations apply, regardless of where the launch takes place.

Question. Would the launch be indemnified by the U.S. government?

Answer. If the launch is licensed by the U.S. Government, so-called "indemnification" may apply.

Question. If another country sells technology to a U.S. company to manufacture a rocket (as Israel has proposed for manufacturing its Shavit launch vehicle in the United States), is that a foreign rocket, or an American rocket? Whose regulations would apply?

What other U.S. government agencies would be involved in regulating the import of foreign rockets for launch from U.S. territory? For example, would the Bureau of Alcohol, Tobacco and Firearms have a role?

Answer. The answer to the question depends on two things: the launch operator and the site of the launch. If the launch operator is a U.S. citizen, U.S. launch operator regulations apply. If the launch site is in the U.S., U.S. launch site regulations apply, regardless of the citizenship of the launch operator.

Trade importation and technology questions are better answered by other entities with primary involvement in these issues, such as the Departments of State, Commerce, Defense, and the United States Trade Representative (USTR).

Question. Are amendments to the Commercial Space Launch Act needed to address any of these issues as the marketplace changes?

Answer. The Administration's reauthorization proposal contained language that would permit the licensing of reentry. This authority is urgently needed to keep pace with the rapid changes in the marketplace. FAA has in fact recently received a request from a company to license the launch and reentry from orbit of its reusable launch vehicle.

Question. When do you expect the draft of the spaceport regulations to be completed?

Answer. We anticipate the draft NPRM will be ready for FAA executive level coordination in late Fall. We would be pleased to keep the Committee apprised of the progress in issuing these regulations.

Question. Does anyone at OSTP have a copy of the draft spaceport regulations?

Answer. No. At this stage in the process, draft regulations are typically not shared with other Federal agencies. When the draft NPRM is circulated in the course of the Office of Management and Budget coordination process, OSTP will be provided a copy and opportunity for comment.

Question. When will the draft spaceport regulations be submitted for interagency review? What is an average time-span for regulations to go through the process?

Answer. Formal OMB review, which, as explained above, provides for interagency review, will take place after FAA/DOT coordination, expected to take place this Fall.

The timeline for formal interagency review by OMB (as established by Executive Order 12866) is 60 days.

Question. At what point in the process do you publish the Notice of Proposed Rulemaking in the Federal Register? How long is the comment period? Is it routine for the comment period to be extended, if requested?

Answer. We will follow the process set forth in the Administrative Procedure Act. The Notice of Proposed Rulemaking (NPRM) will be published in the ***Federal Register***, once OMB approval has been obtained. Comments will be invited from the public for a period of 60 days following publication of the proposed rule. Requests for extension of the comment period will be considered for good cause.

FAA is committed to expediting the rulemaking process wherever possible.

Question. You have stated that the spaceports could submit an application right now for a license. How long is the review process?

Answer. The Commercial Space Launch Act requires that FAA make a determination concerning the licensing of a launch, or the operation of a launch site, within 180 days after receipt of a complete application.

Question. How long before an individual spaceport starts operations, should the license from OCST (AST) be in hand?

Answer. As soon as the license is obtained, operations may commence, in accordance with the terms and conditions of its license. The applicant, should, however, build into its planning process adequate time for the license application review and issuance.

Question. Are there any obstacles to the spaceports submitting an application when there are no regulations governing spaceports?

Answer. No. Existing regulations allow for a launch site operator application to be submitted and reviewed on a case-by-case basis. FAA provides prospective launch site operators with guidelines (first produced in 1994) concerning the materials/information required for FAA to make a license determination. In fact, FAA approved the application of a California corporation to operate a launch site on September 19.

Question. The Commercial Space Launch Act, as amended, requires the licensing of launch site operators. As of this date, 12 years after the Act was passed, there are no regulations issued for launch site operators.

Why have those regulations not been issued?

Answer. The Department of Transportation issued basic licensing regulations on April 4, 1988 that apply to both launch operators and operation of launch sites on a case-by-case basis. These regulations, although focused primarily on requirements for a license to launch a launch vehicle afford guidance relevant to the submittal of an application for a license to operate a launch site. These regulations were designed to allow an applicant the flexibility to propose commercially viable operations. At the time, the only proposed launches were from government launch facilities. Only within the last year was an application received from Spaceport Systems International in California to operate a launch site.

Question. Is there a timeline for issuance of those regulations?

Answer. We anticipate the draft NPRM will be ready for FAA executive level coordination in late fall. An FAA rulemaking team, led by the Office of Commercial Space Transportation (AST), is actively engaged in developing the notice of proposed rulemaking (NPRM) for licensing the operation of non-federal launch sites.

Question. The primary function of the Office of Commercial Space Transportation is licensing and other regulatory functions. As of October 1995, less than half of the employees (10 of 27) were assigned to the licensing division, a situation which continues to this day despite concerns raised by Congress.

When will the personnel allocations be shifted to reflect the primary responsibility of the office?

Answer. In FY 96, AST was authorized a total of 32 FTE's or full time equivalent, employees. In July of this year, AST went through a realignment of its functions to focus more strategically on its licensing and safety mission. 25 of AST's 32 FTE's are now allocated to the licensing, safety, and regulatory areas, an increase of 13 FTE's in these areas.

Question. Responses submitted by your office to questions regarding travel expenditures reflect significant travel not involved with the primary function of the office.

Will the travel priorities of the office be shifted to reflect the primary responsibility?

Answer. In each of fiscal years 1995 and 1996, $80,000 of AST's budget was allocated for travel. Only 6% was expended for travel to a small number of high-priority conferences and trade shows. These events enable AST to encourage, promote, and facilitate U.S. commercial space launches, as authorized by statute, in an efficient and cost-effective manner. In fulfillment of AST's international competitiveness mission, the Associate Administrator and one staff person

have also traveled in support of the USTR to participate in space launch trade agreement negotiations with foreign countries.

AST expects that increased travel resources will be needed to ensure the safety of launch site operations and launches themselves, especially in light of the anticipated transition to new or privatized launch sites. However, existing levels of funding allocated to the international competitiveness mission appear to be adequate.

Question. The Office of Commercial Space Transportation informed the Science Committee in writing that it would issue insurance regulations no later than March 1990, more than 6 years ago. Those regulations still have not been issued. Why have these regulations not been issued? What is the time-frame for issuance of these regulations?

Answer. The Notice of Proposed Rulemaking for Financial Responsibility requirements for launch from federal ranges was published in the ***Federal Register*** on July 25, 1996. The comment period expired on September 23, but will be reopened for an additional 60 days at the request of several potential commenters in the commercial space launch industry.

Question. In your testimony, you state that your office anxiously awaits the first application for a spaceport operator's license based on existing guidelines.

Are you comfortable with the issuance of spaceport licenses based on guidelines alone?

Answer. We believe the existing guidelines, in conjunction with the close consultation AST provides on application matters, are an adequate interim measure.

Prospective spaceport operators have also been given the opportunity to review and comment on the guidelines, and their input has been incorporated in the latest version. Working closely with prospective applicants during a pre-application consultation period also assists in greater effectiveness and the streamlining of the licensing process.

Question. What is the status of the Alaska Aerospace Development Corporation's Environmental Assessment? When will it be completed?

Answer. The Office has issued a Proposed Finding of No Significant Impact (FONSI) and this document and the Environmental Assessment were released for a thirty day public review and comment period, ending on July 25, 1996. Comments from other Federal agencies and the public were received and are in the final review stages, with final action expected shortly.

Question. The Federal Aviation Administration is under criticism for many reasons, one of which is that it is primarily a regulatory agency which is also engaged in the promotion of the industry that is responsible to the taxpayer for regulating.

Is the Office of Commercial Space Transportation, now the FAA's seventh line of business, in a similar situation?

Answer. Language contained in the FAA's pending reauthorization bill deals with "promotion of air commerce" by the FAA in order to address, according to the conferees, public perception associated with the so-called dual mandate. There is no corresponding effort dealing with commercial space activities, which are codified separately from FAA's aviation activities in the U.S. Code, perhaps because similar public perceptions have not developed to date.

Question. In the absence of spaceport regulations, how can DOT make proper decisions regarding the construction of a spaceport, as it is doing in Alaska?

Answer. Under the current basic regulatory framework, along with the guidelines, a prospective applicant can begin the pre-application consultation process, during which the applicant's proposed spaceport and facility concept would be discussed with respect to AST's safety concerns. Specific and unique safety issues are discussed and treated on a case-by-case basis during this process, allowing the applicant to prepare an application with full knowledge of AST's safety concerns and efficiently complete the licensing process.

Answers to Questions Submitted for the Record by Mr. Walker

Question [Request]. Please provide the names of the individuals in your office who were involved in the consultative process with the United States Trade Representatives (USTR) on the Ukrainian launch trade agreement.

Answer. Frank Weaver; Richard Scott; Damon Wells.

Question [Request]. Please provide copies of correspondence, if any, that was sent to and/or from the USTR during consultations regarding the Ukrainian launch agreement.

Answer. There was no formal correspondence between the two entities during this time. Contact was primarily via the telephone, and during interagency meetings.

Question. Prior to the signing of the Ukrainian launch trade agreement on February 21, 1996, did the Department of Transportation (DOT) convey to the USTR that the agreement would be in the best interest of the United States?

Answer. Yes. The substance of the agreement was reached in interagency deliberations that included the Department of Transportation, with certain key strategies ultimately approved by the President. DOT's concurrence with the terms of the agreement was conveyed during those interagency discussions.

Question. When did DOT approve the final content of the Ukrainian agreement?

Answer. DOT concurred in the final content of the agreement while it was being negotiated between the U.S. and Ukrainian delegations in Vienna in mid-December 1995. There was a final review of the document between negotiation and signing, but no substantive changes were made at that time.

Questions submitted to the Record by Mr. Sensenbrenner to Mr. Don Eiss for the June 12, 1996 International Space Policy Hearing

Prepared by the Office of the U.S. Trade Representative

(1) Q You mention in your testimony that one of the goals of the agreements has been providing access for United States' satellite manufacturers to foreign launches from "economies of transition."

- Do you mean that Russia, Ukraine and China are in the process of transitioning to market economies?

- What do you anticipate will happen if the current Non Market Economies (NME) do not make the transition by 2000-2001 (when the 3 agreements expire)?

- Do you think that USTR learned from the 1989 Chinese agreement and has made the subsequent agreements stronger and more stringent?

A The United States considers Russia, Ukraine and China as countries in a process of transition to a market economy status. As is stated in the Clinton Administrations "National Space Transportation Strategy" of August 5, 1994, a goal of the United States is to achieve free and fair trade in commercial space launch services. The agreements in effect with Russia, Ukraine and China reflect the peculiar competitive conditions created by the transitional nature of each country's economy. The status of the process of economic transition in each of these economies, along with a number of other factors (including the actual extent of disruption to the international commercial market for launch services to the detriment of U.S. space launch interests) will be examined as the expiration of each agreement approaches in 2000-2001 and as the Administration assesses U.S. space interests in the post-2000 period.

The Administration's experiences under the first China space launch agreement (1989-1994) definitely guided the negotiating priorities for renewing the agreement. As a result of those experiences, a number of specific areas were targeted by the U.S. for new provisions, all of which were achieved. These included:

-- an annex of factors and associated values to guide the application of the pricing disciplines of the agreement;

-- the introduction of a 15 percent pricing band which will allow us to focus on those competitions in which Chinese pricing most threatens the integrity of the pricing disciplines;

-- elimination of the "promotional pricing" justification for commercial launches; and

-- clarification of the coverage of the agreement to include directed procurement and leasing on orbit.

The Administration viewed these provisions as being applicable, with some modifications, to other economies in transition wishing to enter the commercial space launch market. The U.S. thus reached agreement to include largely similar provisions in the agreement with Ukraine and in the amendments to the agreement with Russia.

(2) Q "Under the President's (Clinton) constitutional authority to negotiate with foreign governments" this Administration has negotiated and signed the 3 current launch trade agreements.

- What is the justification for amending the 1993 agreement with Russia to increase the price differential from 7.5% to 15%; add comparability factors to adjust the NME bid; softening the special consultation trigger from "shall require" to "may request"; and going from 8 launches to 15 launches with provisions for an additional 4?

A The Administration found that its experience in renegotiating the space launch agreement with China was applicable in important respects to U.S. commercial space launch policy toward both Russia and Ukraine. In this light, the Administration successfully pursued with both Russia and Ukraine: 1) a new 15 percent pricing band for launches to geosynchronous earth orbit (GEO) to allow the Administration to focus on those competitions in which Russian pricing most threatens the integrity of the agreement's pricing disciplines and 2) the addition of an annex of factors to guide the application of the pricing disciplines. In the case of the amendments it negotiated to the Russian agreement, the Administration concluded that addition of the annex of factors in particular would allow a change regarding the resort to special consultations called for in the agreement's article on pricing. Specifically, the change from "shall require" to "may request" in cases of Russian pricing which fell 15% below comparable Western bids allows the Administration the flexibility to avoid resource-intensive international meetings in cases where low Russian pricing can be explained through analysis of the annex of factors, while fully protecting the U.S. right to insist on special consultations in cases where such analysis does not lead the Administration to conclude that a particular Russian bid was in compliance with the agreement.

In the case of the Russian agreement's quantity restrictions on Russian launches to GEO, the U.S. concluded that the adjustment of the restrictions was appropriate given the evolving nature of the international market and that the new restriction level will ensure adequate opportunities for participation in that market both for the U.S. launch industry and for U.S. satellite firms.

(3) Q The annual consultation with China has been scheduled for mid-July. Under the terms of the 1995 agreement, China is required to provide, in advance of the consultation, comprehensive information to the U.S. regarding prices, terms, and conditions offered by the Peoples Republic of China (PRC) launchers for the launch of satellites. The U.S. may request additional information on the prices, terms, and conditions and the PRC is required to respond within 30 days.

- What information has been provided by China for the consultation? Has the U.S. requested any additional information? If so, when and what specific information was requested?

A In the course of the annual consultations, the United States requested information regarding the prices, terms and conditions of all commercial space launch competitions of which we were aware of Chinese involvement. The Chinese provided responses to U.S. inquiries in each instance during the consultations regarding the technical characteristics of the satellite, proposed Chinese launch vehicle, prices and related adjustment information as provided for in the pricing comparability annex in the agreement.

(4) Q Article IV, Title 8 says the U.S. and PRC shall also provide each year, information about commitments, PRC launchers have undertaken to provide commercial launch services. Anecdotal complaints have been heard about China, in particular, offering launches far below market prices.

Have any complaints been formally filed with any agency of the federal government making such allegations against China, Russia or Ukraine?

- If so, were the allegations investigated?

- If so, what were the results of the investigation and what actions were taken by the federal government to remedy the situation?

A No formal complaints have been filed with the U.S. Government regarding compliance by China, Russia or Ukraine commercial launch service providers with the provisions of the respective agreements.

(5) Q The commercial launch trade agreements establish mechanisms for dealing with violations of the bilateral space launch agreements, specifically through consultations between the parties. The U.S. reserves the right to respond to a violation.

• Is this the most effective approach for dealing with violations? Are stricter compliance methods needed?

A The U.S. believes that the existing implementation provisions of the individual agreements best reflect U.S. interests by leaving in the hands of the United States key judgments regarding compliance with the agreement and appropriate U.S. responses. As a result, the agreements leave the U.S. wide, independent latitude to identify practices which raise concerns, seek modification of those practices in the first instance, and ultimately to unilaterally weigh U.S. interests and decide which authorities under U.S. law provide the most appropriate response if concerns are not addressed to the satisfaction of the U.S. and US industry interests. No new compliance provisions are needed.

(6) Q Both parties to each commercial space launch trade agreement are required to furnish information on how many launches they have sold and for what price, with this information held as proprietary. A summary of the data then can be publicly released.

• What documents have been provided by the Russians or Chinese to comply with this provision? How do you verify that the information provided by China, Ukraine and Russia is accurate?

A China and Russia have supplied information to the United States regarding the prices, terms and conditions associated with launches in which the parties have been involved that are covered by the provisions of these agreements. That information is then analyzed by a Working Group on Information (WGI) which is chaired by the Department of Transportation and includes representatives of agencies with the technical expertise necessary to assess the information supplied by the PRC and Russia. Among its functions, the WGI reviews the information supplied by the PRC and Russia in light of information independently available to the WGI from various industry and government sources. To the extent that inconsistencies might arise, the WGI could recommend follow-up communications with the PRC and Russia to clarify the situation. Ukraine has not yet established an active presence in the international commercial launch market, but it is anticipated that the above process will also apply to Ukrainian launches.

(7) Q The provisions in the agreements concerning low earth orbit (LEO) launches are vague because the market is still developing.

• At what point do you anticipate that more definitive rules will need to be defined for LEO launches? What are the major issues that you expect to arise during such negotiations?

A The Administration considers that the provisions regarding LEO in each of the three agreements represent the most appropriate disciplines for that market taking into account the unique aspects of that market, especially as they relate to the deployment of global mobile satellite communications constellations. Launches to LEO are covered by the same pricing disciplines as apply to launches to GEO. The quantitative guidelines for launches to LEO, while different than the absolute limits which apply to GEO, are most appropriate to the LEO market. They were developed in close consultation with industry and should contribute to the overall development of this market segment with significant participation by U.S. space launch service providers in that development. While at this point it is not anticipated that there will be a need to fundamentally revise these provisions, the U.S. will closely monitor the evolution of this market and solicit the input of U.S. commercial space launch service providers participating in it. The U.S. will evaluate any proposals for changes to the provisions at such time as they may be provided.

(8) Q Japan and Israel both have indicated interest in entering the commercial launch services market. What is the status of their attempts to do so? Will the U.S. negotiate launch trade agreements with them, too?

What other countries are likely to enter the market in the next 5 years? Do you foresee any special issues associated with these countries?

A It has been reported in the press that the Hughes Electronics Corporation is negotiating with Japan for a package of 10 launches to GEO with the first launch not to occur until the year 2000. The Administration is not aware of Israeli efforts to enter the commercial market for launches to GEO. If either country establishes a presence in the international commercial market for launches to GEO, the Administration will consider, in consultation with affected U.S. industries, what steps at the governmental level might be appropriate to advance the U.S. goal of achieving free and fair trade in launch services.

Other countries do have programs designed to develop a commercial space launch capability of some sort, including India and Brazil. It is not possible to predict the relative success those programs might achieve over the next five years nor speculate at this time on the special issues either country's entry into the market might raise.

(9) Q One of the goals of the launch trade agreements is to provide for an interim step for countries transitioning to market economies. What do you anticipate post-2000/2001 when these current agreements expire? Do you expect to negotiate new ones? Do you expect any of these countries to have established market economies?

A See answer to question 1.

(10) Q With respect to the enforcement provisions within the trade agreements:

- Has the U.S. requested consultations, as provided for by the agreements, to enforce pricing provision? If so, when, and what resulted from the consultation?
- Do the consultations provide redress for unfair pricing practices?
- Are the pricing restraints enforceable? If so, how?
- What power does the USTR actually have to enforce launch trade agreements?
- Has the USTR ever used that power in enforcing the previous and current launch trade agreements?
- Is the denial of an export license an appropriate enforcement tool if it can only be used in the most egregious of instances?

A The U.S. has reviewed pricing by each of the three countries in the context of annual consultations under the agreement but has not exercised its right to request consultations solely for the purpose of questioning the consistency of pricing in an individual competition with the provisions of the agreement. With the improvements to the pricing provisions that have now been incorporated into all three agreements, the U.S. believes that application of those provisions in individual competitions will be a much less contentious matter than in the past. How launch service providers in each of the three countries actually perform relative to the improved pricing disciplines remains to be seen.

Under the terms of the agreement, the U.S. retains freedom regarding decisions on compliance and enforcement. These agreements are considered trade agreements by the United States. A violation of the provisions of these agreements would fall within the scope of section 301 of the Trade Act of 1974. Section 301 provides a broad range of measures from which to choose in response to a violation of a trade agreement. For example, USTR may (i) suspend, withdraw or prevent the application of trade agreement concessions; (ii) impose duties or other import restrictions on the goods of the foreign country; (iii) impose fees or restrictions on the services of the foreign country; or (iv) enter into an agreement with the country that commits the

country to eliminate the offending practice. Ultimately, USTR's authority under section 301, subject to the direction of the President, encompasses any power of the President.

The impact of this broad ranging authority should not be underestimated. It was precisely the threat of denying China access to the U.S. market for numerous products valued at up to $2 billion that contributed to successfully negotiating changes in China's behavior regarding the protection and enforcement of intellectual property rights. The USTR has not found China, Russia or the Ukraine in violation of section 301 with respect to implementation of our bilateral space launch trade agreements. The Administration believes that section 301 provides adequate enforcement authority to respond to any enforcement situation which might arise.

Questions Submitted for the Record by Mr. Walker for the June 12, 1996 Hearing for Ms. Catherine A. Novelli

Prepared by the Office of the U.S. Trade Representative

(1)Q Please provide the names of the individuals at the various agencies (i.e. NASA, DOT, DOD) who were involved in the consultative process with the United States Trade Representative (USTR) on the Ukrainian launch trade agreement.

A The formulation of U.S. negotiating strategies and positions on individual issues connected with the space launch negotiations with Ukraine were coordinated in the first instance by USTR through its chairmanship of the Trade Policy Staff Committee. For the purposes of the negotiation with Ukraine, the following agencies participated in the policy formulation process and, with some exceptions, on the U.S. delegations to the negotiating sessions with Ukraine: USTR, Department of Transportation, Department of Commerce, Department of State, Department of Defense, Department of the Treasury, and NASA. In addition, several elements of the Executive Office of the President, aside from USTR, actively participated throughout the policy formulation process. These included the Office of the Vice President and the Office of Science and Technology Policy, as well as officials of the National Economic Council and the National Security Council.

(2)Q Please provide copies of correspondence, if any, between USTR and these agencies, and USTR and the Science Committee during consultations regarding the Ukrainian launch agreement.

A The process of policy formulation connected with negotiation of the commercial space launch agreement with Ukraine was conducted via interagency meetings and phone calls. Agencies, following customary practice, did not employ formal, written correspondence in the conduct of their discussions. Similarly, discussions with the Science Committee occurred during informal briefings by USTR staff of Space Subcommittee staff prior to the initialing of the agreement text on December 14, 1995. Toward the end of the interagency consultative process, interagency decision at a senior level on key negotiating positions was solicited by means of written classified communication.

(3)Q During the consultative process and prior to the signing of the agreement on February 21, 1996, did you have confirmation from each agency involved in the consultative process and the Science Committee that the Ukrainian launch trade agreement would be in the best interest of the United States?

- o If so on what date, and by whom?

A During the consultative process agency representatives indicated their agreement with various U.S. negotiating positions in the course of interagency meetings and/or

phone calls. In addition, agency representatives on negotiating delegations actively participated in the interchange with Ukraine on the drafting of agreement text. Final interagency agreement on negotiating strategy was reached through a decision by the President. Please see next question regarding final interagency approval of the agreement text.

Prior to the conclusion of these negotiations and again following the initialing of the agreement text, USTR staff consulted the Science Committee and other relevant congressional committees. The first consultation with the House Science Committee's Space Subcommittee staff occurred on December 6, 1995, conducted by Deputy USTR Jeff Lang.

(4)Q On what date did the agencies and the Science Committee approve the final content of the Ukrainian agreement?

A An interagency delegation represented the United States at the final negotiating session with Ukraine December 12-14, 1995. The text of the agreement was initialed on behalf of the U.S. delegation by Deputy Assistant U.S. Trade Representative Catherine Novelli on December 14. The subsequent government shutdown delayed the process somewhat, but during January 1996 the initialed text was, following customary practice, referred to the headquarters of relevant agencies for review and for certification of compatibility of the English and Ukrainian language texts. Copies of the initialed agreement were also shared with certain interested committees in Congress, including the Science Committee. No agency indicated disapproval of the initialed agreement, which was therefore submitted in late February for the Vice President's signature on the behalf of the United States. Similarly, no congressional staff or committee indicated disapproval of the initialed Ukraine agreement text either during briefings or telephone conversations.

LOCKHEED MARTIN

RESPONSE
of
DR. BRIAN D. DAILEY
to
QUESTIONS SUBMITTED FOR THE RECORD
of the
HEARING
on
US SPACE LAUNCH STRATEGY

HOUSE COMMITTEE ON SCIENCE
SUBCOMMITTEE ON SPACE
June 12, 1996

Questions Submitted by Mr. Sensenbrenner:

(1) Question: In your testimony you address the challenges the U.S. launch industry faces in the international marketplace. However, you do not necessarily address solutions.

- What would you suggest the U.S. launch industry or government do to enable us to become more competitive (and still make a profit) in the international launch market?

Answer: Government and industry must explore alternate approaches to financing launch technology development and to regulating trade in commercial launch services to address effectively the two-fold challenge facing the US launch industry today: increasing competition in the international launch market against a backdrop of shrinking civil and defense budgets.

On **launch technology development**, Lockheed Martin's record illustrates how some of the possibilities are being implemented through greater infusions of private capital:

- $700 million invested over the past several years by Lockheed Martin and its heritage companies to finance commercial Atlas performance upgrades, infrastructure improvements, and new vehicle purchases;
- $300 million investment by Lockheed Martin, plus an additional $200 million by our industry teammates, to modernize further our launch systems and thereby enhance competitiveness;
- the LMLV family of launch vehicles that was financed entirely by private capital; and
- NASA's choice of Lockheed Martin's VentureStar™ for the X-33/Reusable Launch Vehicle program, to which the industry team has committed over $200 million in cash and IR&D funds;

and through mutually beneficial cooperative arrangements with international space organizations:

- International Launch Services, our joint venture for complementary marketing of the Atlas vehicle with the Russian-built Proton; and
- Integration of the Russian RD-180 engine into our plans for the Atlas IIAR and the Evolved Expendable Launch Vehicle (EELV).

That said, although industry is investing private capital and looking abroad for ways to reduce the government's financial burden, it would be difficult if not impossible to sustain this approach unless its foundation, i.e., industry's historical core government customer base, remains intact. Therefore, unqualified reliance on the US launch industry to meet government mission needs must continue to be the central tenet of US launch policy. Also, while endorsing existing policy on judicious use of foreign technology, we also urge the US government to maintain the prohibition on use of foreign launch systems, including converted foreign excess ballistic missile assets, to launch government payloads. Lastly, in recognition of industry's assumption of greater financial risk in technology development and the need to be increasingly more responsive to commercial customers, policies encouraging agencies to factor the launch industry's commercial requirements into their development strategies must be fully implemented.

On the **launch trade policy** side, we believe that the US government should dispense with quotas as a regulatory device for addressing potential inequities among competitors in the marketing and sale of commercial launch services and, instead, move towards an overall trade framework covering all active competitors in the global market that focuses on unreasonably low pricing and other unfair trade practices.

(2) Question: During the Subcommittee hearing, *"Global Trade in Satellites and Launch Services,"* which was held September 1994, issues were raised about the U.S. government and its effect on trying to level the international playing field for launches.

- Since that hearing, have the issues been dealt with, such as leveling the playing field and encouraging market practices?

Answer: Some progress has been made. The US government has signaled its intention to transition away from reliance on quotas as the primary device for managing launch trade. As a first step, the Administration should be commended for its negotiation of more flexibility into the bilateral agreements, respectively, with Russia, China, and the Ukraine, specifically in relation to quotas and pricing. This, however, is not enough to respond effectively to the dynamics of a rapidly changing marketplace - both in terms of the projected number and size of commercial satellites to be launched over the next 10 years, the increasing number of launch suppliers competing for these opportunities, and the increasingly international complexion of joint ventures to provide commercial launch services. So long as quotas -- particularly on launch of Russian-built systems -- remain the cornerstone of US launch trade policy in this environment, Lockheed Martin's International Launch Services, which is the nation's largest supplier of commercial launch services, will be operating at a competitive disadvantage. As noted above, Lockheed Martin continues to support maintenance of an overall trade framework, but it should be one that relies far less over time on quotas and focuses more on unreasonably low pricing and other unfair trade practices, especially in cases where there is demonstrable harm to US interests (i.e., a "harm test"). In addition, this framework must be a comprehensive one that covers all active competitors in the world launch market, including the Europeans.

(3) Relative to launch trade policy, your written testimony states that, "U S. trade policy remains virtually synonymous with one word: quotas." First, given the number of suppliers currently active in the market, this approach from a practical standpoint, is unmanageable. Second, quotas constrain access to the supply of much needed launch capacity. Third, the current quota system only applies to certain suppliers, and relatively marginal ones at that.

- *(A) Question:* What would be a more effective way for the U. S. government to handle its foreign policy on launch issues?
- *Answer:* As noted above, Lockheed Martin supports maintenance of an overall trade framework that relies far less over time on quotas and focuses more on unreasonably low pricing and other unfair trade practices, especially in cases where there is demonstrable harm to US interests (i.e., a "harm test"). In addition, this framework must be a comprehensive one that covers all active competitors in the world launch market, including the Europeans.

- *(B) Question:* Is it possible to reach an industry consensus on whether we should have launch trade agreements and how they should be reinforced?
- *Answer:* The US satellite industry, which includes companies that also have significant launch equities like Lockheed Martin, Boeing, and Orbital Sciences, is on record as recommending that the US government move away from quota-based launch trade agreements. This consensus recommendation was conveyed to Vice President Gore by satellite industry CEOs at an Executive Forum of the Satellite Industry Task Force in September 1995. It is based on the view that quotas have not improved overall US competitiveness and have not loosened Europe's firm grasp on 50 to 60% of the market. Instead, quotas artificially and unnecessarily constrain the satellite industry's access to space at a time when, for the next 5 years at least, there is a critical need for the full range of launch options. With respect to enforcement, both satellite and launch companies testifying at the Subcommittee's hearing, "Global Trade in Satellites and Launch Services," held in September 1994, agreed that the commercial satellite export license process is not an appropriate mechanism for enforcing launch trade agreements. Lockheed Martin believes that any remaining differences within the US launch industry on these issues can be resolved.

(4) Question: Is Lockheed Martin looking for an alternate launch site for the Proton launch vehicle?

Answer: In February 1995, the Board of Directors of Lockheed Khrunichev Energia International (LKE) - now part of International Launch Services (ILS) - directed that a study be conducted to determine the feasibility of developing a near-equatorial launch site for commercial Proton missions as an alternative to the Baikonur Cosmodrome, Kazakhstan where the launches currently take place. The initial phase of the study - to develop a site specific capital investment requirements document - was completed in September 1995, and a Technical Assistance Agreement was recently approved by the State Department to pursue the next phase. However, at the Board's most recent meeting in July, it was decided to slip the timetable for this initiative by 5 years and to focus instead on making necessary modifications to Baikonur to support launches of western-built commercial satellites from that facility.

- *(a) Question:* If so, what are the criteria by which such a decision will be made?
- *Answer:* The study was to explore the feasibility of each of the alternate launch sites in terms of the following factors:
  - Technical - Proton facility and servicing requirements, civil engineering issues, tandem launch performance, geographic location
  - Policy/regulatory - launch trade, environmental, MTCR issues
  - Economic - costs, capital investment, revenues, government contribution
  - Infrastructure - transportation, utilities, housing
  - Marketing - launch projections, sales forecast, tandem launch sales feasibility

Based on an assessment of all these factors, the Board would make a business decision on the preferred site.

- *(b) Question:* What locations would be considered?
- *Answer:* The three principal alternatives that the study was to focus on were Alcantara, Brazil; Darwin and Cape York, Australia; and Cape Canaveral Air Station (CCAS), Florida.

- *(c) Question:* When would a final decision be made?
- *Answer:* The original timetable contemplated a decision on a particular site by the end of 1996, with IOC 1999. However, as noted above, the timetable has been delayed by 5 years.

- *(d) Question:* Would Lockheed Martin or its Russian partners make the final decision?
- *Answer:* The decision would be made jointly by Lockheed Martin *and* our Russian partners.

(5) Question: Is Lockheed Martin considering Cape Canaveral as an alternate launch site for the launch of Proton launch vehicles?

Answer: As noted above, CCAS was one of the candidate sites to be evaluated in the Alternate Launch Site feasibility study.

- *(a) Question:* If so, what are the pros and cons of that site?
- *Answer:* The feasibility study has not been completed and the timetable for completion has been slipped by 5 years. Based on a preliminary assessment, CCAS offers the advantages of a well-established launch facility that is in the US and is located considerably closer to the equator than Baikonur. The principal disadvantage is that the other possible alternate sites are even closer to the equator than CCAS - Alcantara, in particular, is almost ideal from that standpoint. Another factor that could represent a disadvantage is that any potential launch site would be located on an active US military base and launch range which necessarily operates under a strict security regime.

- *(b) Question:* What, if anything, could the federal government do to make that site more attractive?
- *Answer:* Given we have completed only the very preliminary phase of the study, it would be premature at this time to suggest what the US government might do to enhance the feasibility of CCAS.

(6) Question: Has Lockheed Martin considered Brazil as an ultimate launch site?

Answer: As noted above, Alcantara, Brazil was one of the candidate sites to be evaluated in the Alternate Launch Site feasibility study.

(7) Question: What is the economic impact of a launch from any particular site?

Answer: We do not have sufficient information to provide a view on this issue.

(8) Question: Have you spent any money on modifying or upgrading the Proton launch facility?

Answer: Lockheed Martin has made no direct investment in modifying or upgrading Proton launch facilities at the Baikonur Cosmodrome.

(9) Question: Are the Proton and Atlas comparably priced?

Answer: International Launch Services markets, on a complementary basis, both commercial Proton and Atlas. The pricing of Proton complies with the applicable pricing standards in the US-Russia agreement, which include a requirement that launches of Russian-built vehicles must be comparable in price to similar western launch vehicles taking into consideration specific "comparability factors."

(10) Question: What have the launch trade agreements with China, Russia, and Ukraine actually accomplished for the U.S. launch industry? Have they leveled the playing field and encouraged market practices?

Answer: The launch trade agreements may have succeeded in restraining unfair competition on the part of some players competing in the international market, especially those launch suppliers that are government-dominated and are not affiliated with US companies. However, if improvement in overall market share for US launch providers is the index for success, the launch trade agreements have probably accomplished very little (i.e., European-dominant market share has remained largely the same). In that regard, the quota on Proton launches - which are marketed by International Launch Services (ILS) in conjunction with our Atlas system - is, in fact, a constraint on our ability to challenge the Europeans' firm grip on 50-60% of the market.

On the issue of market practices, Lockheed Martin can only respond in terms of our Russian experience. We believe that the Russian launch sector has made significant moves in the direction of more market-oriented practices. This has occurred for two reasons. The first is the political and economic reform in Russia over the past several years, which is transforming Russia's launch industry from a Ministry-directed state enterprise to one that must now operate in a more business-like and cost-consious fashion. The second, we submit, is our joint venture with Khrunichev and Energia to supply commercial Proton launch services which provides our Russian partners with direct, continuous, hands-on experience managing a business according to "western" market practices. In our view, this practical experience is more effective in encouraging market practices in the commercial launch sector than relying on quotas.

(11) Question: How can launch trade agreements with the non-market economies be enforced without harming the competitiveness of the U.S. satellite industry?

Answer: Enforcement of a launch trade agreement that imposes quotas on commercial launches using foreign launch vehicles has a serious adverse impact on US satellite industry competitiveness. We believe that the competitiveness of both the satellite and launch industries would be enhanced by phasing out quota-based agreements and replacing them with an overall trade framework that focuses more on unreasonably low pricing and other unfair trade practices. This approach would strike the appropriate balance between the satellite industry's need for the full range of available options to access space, and the launch industry's need for safeguards against predatory pricing by non-market oriented competitors.

(12) Question: Are U.S. export controls a significant factor when U.S. companies are trying to win satellite contracts from international customers?

Answer: As detailed in my testimony in the September 1994 hearing on *"Global Trade in Satellites and Launch Services,"* the designation of commercial communications satellites as Munitions List items which are subject to State Department export controls has historically placed a significant burden on the US satellite industry's ability to compete successfully in the global marketplace. For that reason, the industry has long urged the US government to transfer commercial communications satellites to the Commodity Control List of dual-use items that is

under the export control jurisdiction of the Commerce Department. On March 14, 1996, the Administration announced a decision to transfer all commercial communications satellites from the Munitions List to the Commodity Control List. Lockheed Martin applauds this decision, and has urged State and Commerce promptly to promulgate regulations that will fully implement the transfer.

(13) Question: What should be the long-range goal of these launch trade agreements?

Answer: The long-range objective of US launch trade policy should be a market environment in which US launch companies can compete without the threat of their foreign competitors engaging in unreasonably low pricing and other unfair trade practices that result in actual harm to them, and in which access to space for US satellite companies is not unreasonably or unfairly constrained.

Questions Submitted by Ms. Sheila Jackson-Lee:

(1) Question: How willing would Lockheed-Martin be to continue to provide confidential and proprietary business data to the United States Trade Representative if you knew that the data would be shared with Congress?

Answer: Maintaining the confidentiality of proprietary business data is a critical prerequisite to our willingness to provide information to the government to support its compliance monitoring and enforcement of the launch trade agreements.

(2) Question: Is the confidential and proprietary business data that your company provides to the United States Trade Representative provided on a voluntary basis, or are you required to submit the data by the launch agreements?

Answer: The information provided to USTR is provided on a voluntary basis. The launch trade agreements impose information exchange requirements on the government signatories, not the launch companies. However, recognizing that USTR cannot monitor compliance or enforce the agreements without such information, the companies have been willing to cooperate so long as their business proprietary interests are properly addressed.

(3) Question: Would you please describe the degree of involvement you have with minority and women entrepreneurs in your particular business?

Answer: We are completing our research on this question, and a response will be provided directly to Congresswoman Jackson-Lee.

October 7, 1996

Questions submitted for the Record for the June 12, 1996 hearing:

Stanley Ebner
Senior Vice President
Washington Operations
McDonnell Douglas Corporation

1. In your testimony, you discuss the unanticipated risks for the Delta III program since the agreement with Ukraine and the re-negotiation of the agreement with Russia were finalized this year. You stated that it does not only have the potential to affect McDonnell Douglas but it also may affect your subcontractors.

• What impact have the recent launch trade agreements had on proceeding forward with the Delta III?

The launch agreements have not changed our decision to proceed with the Delta III, but we remain very concerned that the agreements will adversely impact its ultimate commercial success. The lack of enforcement has resulted in the perception that the quantity limits have become an entitlement rather than limit. Because of the lack of enforcement, we find ourselves competing against countries that do not have the same price and market constraints as we do.

• What has changed in the international launch marketplace since the National Space Transportation Policy of 1994?

The quantitative limits imposed by the three launch services agreements with the PRC, Russia and the Ukraine tripled the available launches by these NMEs from 20 to 60 over the life of the agreements. Although we hope that the market will grow, the market projections currently show that there is no way that this tripling of the limits to NMEs can avoid having an adverse impact on the domestic launch industry.

2. In your testimony, you state that McDonnell Douglas has never sought to exclude non-market suppliers from the market, and you simply ask that, "the realities of their potential impact continue to be recognized as they were before the recent bilateral agreement changes, and that (McDonnell Douglas) be afforded the benefits of the same fair trading rules applied to other industries." You also go on in your testimony to say that the pricing provisions of the trade agreements have not been enforced effectively.

• As an industry representative, what do you suggest the U.S. government do to do a better job in enforcing these provisions?

Enforce the terms of the trade agreements, as written, take all necessary steps to ensure NME pricing is within the terms specified and to ensure that the quantity limits are maintained for the duration of the agreements.

- **How are other industries treated by the USTR?**

This is best answered by the respective industries.

- **What fair trade rules apply to them that do not apply to the launch industry?**

The World Trade Organization rules apply to products but do not cover services like launch services with the same degree of specificity or enforceability.

3. You assert that the pricing provisions of the commercial space launch trade agreements have not been enforced very effectively.

- **On what basis do you make that assertion? Do you have <u>proof</u> that China, Russia and the Ukraine have not abided by these agreements?**

The specific pricing information necessary to make that determination is available only to U.S. Government authorities but it has been widely reported in the press that significant underselling by NME suppliers has occurred.

4. Has McDonnell Douglas filed any type of complaint with any government agency about violations of any of the commercial launch trade agreements? If so, what was the outcome? If not, Why?

We have informally discussed this matter on numerous occasions with various U.S. Government authorities and on a few specific occasions, have asked for enforcement to no avail. Under current law, we could file a complaint under Section 301. This is a time-consuming procedure involving a number of different government agencies. The remedies available under Sec. 301 include increasing tariffs or restricting the import of goods, remedies that impact unrelated products and industries. We have filed no formal complaint, because the current procedures that are available become irrelevant because of the need for timely action.

5. Why hasn't McDonnell Douglas entered into joint ventures with foreign launch service providers as Lockheed Martin and Boeing have?

We have not identified a partner that would meet our commercial and technical requirements.

6. During the time that you conducted your market assessment that led to the decision to proceed with Delta III, did you consider joining with a foreign partner to satisfy that market segment? If so, why did you choose not to do so? If not, why not?

We did not feel it necessary to join with a foreign partner to achieve market access in our plans for Delta III. However, we will purchase oxygen tanks from Mitsubishi with a value of approximately $1 million for each $50-$60 million Delta vehicle, and our subcontractor Pratt Whitney is contracting for extendible nozzles from the French.

7. What have the launch trade agreements with China, Russia, and the Ukraine actually accomplished for the U.S. launch industry: Have they leveled the playing field and encouraged market practices?

The agreements have not helped the US launch industry. The agreements have allowed the US satellite industry to have access to NME launchers at heavily subsidized prices. The agreements have helped the NME launchers by giving them access to U.S. satellites, which they did not enjoy prior to the agreements. At this point, it is not clear that the implementation of the agreements has succeeded in encouraging NME suppliers to adopt market economy practices or standards with respect to their participation in the international market.

8. How can launch trade agreements with the non-market economies be enforced without harming the competitiveness of the U.S. satellite industry?

The pricing and quantity standards apply without regard to the nationality of the respective satellite company.

9. Are U.S. export controls a significant factor when U.S. companies are trying to win satellite contracts from international customers?

This is best answered by the satellite companies.

10. What should be the long-range goal of these launch trade agreements?

To insure that all launch services suppliers are competing on the same terms and conditions.

Question from Cong. Sheila Jackson Lee:(To all companies)

Would you please describe the degree of involvement you have with minority and women entrepreneurs in your particular business?

McDOnnell Douglas' Socioeconomic Program had a positive year in 1995. Our purchases from Small/Small Disadvantaged Businesses totaled $732 million, with $145 million awarded to Small Disadvantaged Business. From 1993 through 1995, McDonnell Douglas purchased goods and services from Small/Small Disadvantaged Businesses totaling more than $2.2 billion. McDonnell Douglas Aerospace, a major component of McDonnell Douglas Corporation, exceeded the Department of Defense goals of 20% Small Business purchases and 5% Small Disadvantaged Business purchases.

In calendar year 1995, McDOnnell Douglas Aerospace achieved subcontract awards of $630 million (24.3%) to small businesses and $132 million (5.1%) to Small Disadvantaged Businesses. In conjunction with this performance, the Department of Defense selected McDonnell Douglas to participate in its Comprehensive Subcontract Plan Pilot Program for FY96.

Teledesic

July 29, 1996

Hon. Robert S. Walker
Chairman, House Committee on Science
2369 Rayburn House Office Building
Washington, D.C. 20515-3816

Dear Chairman Walker,

Teledesic Corporation ("Teledesic") appreciated the opportunity to participate in the Science Committee's hearing on U.S. space launch strategy held on June 12, 1996. This letter is in response to your verbal questions about Teledesic's involvement in the consultative process leading up to the U.S. commercial satellite launch agreement with Ukraine and request for further information for the record. In addition, we have attached a response to the written questions that were submitted to us following the hearing.

Teledesic was one of the many U.S. companies that participated in U.S. Government briefings and provided information on the private sector perspective on the negotiations with Ukraine on the space launch strategy. Teledesic's contacts were made principally with officials at the U.S. Trade Representative's Office. However, we also spoke with officials from the Departments of State and Transportation on this issue.

In our discussions with U.S. officials, we provided information on the nature of Teledesic's planned broadband low-Earth-orbit system, the system's potential applications, the anticipated timetable for system deployment, and Teledesic's anticipated needs for commercial launch services. We also expressed Teledesic's interest in the conclusion of an agreement with Ukraine that would not restrict the company's ability to deploy its global satellite system on schedule by imposing unfavorable launch quota restrictions. The U.S. officials responded to these concerns, and those of other like-minded U.S. companies, in developing the final text of the U.S./Ukraine agreement.

We hope that this information is helpful to you and the Committee. Please do not hesitate to contact us if you have any further questions.

Sincerely,

David Montanaro

David Montanaro
Vice President, Strategic Relations

Teledesic
Corporation

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Questions Submitted for the Record by Mr. Sensenbrenner for the June 12, 1996 Hearing for Mr. Montanaro

1. As a future customer of space launch services, what are the most important factors in choosing which launch supplier to use?

2. In what order would you rank the following factors, from most to least important:
   - reliability
   - price
   - payment schedule
   - insurance availability and affordability
   - launch schedule
   - What other significant factors do you consider?

Questions 1 and 2 are best addressed together. At Teledesic, we believe strong partnerships are critical to our success. To that end, we would select launch service providers in the same manner we would evaluate any potential industrial partner. We have four different criteria - we call it the "4 C's": capability, commitment, competitiveness and cultural alignment. We consider each of the "4 C's" necessary but non-sufficient in and of themselves as a foundation for a strong partnership. Let me briefly expand on each of the "4 C's":

Capability: This refers to a potential partner's ability to reliably and competently perform the task(s) at hand. With respect to launch service providers, this means being able to reliably deliver our spacecraft to a specific orbit.

Commitment: This refers to a potential partner's dedication to the business aspects of the goods or services they are proposing to Teledesic. Is a potential partner committed to continuously improving their performance and competitive advantages? Are they making investments in their capability independent of Teledesic? With respect to launch service, we would look for partners who acknowledge the shift in space-based communication systems from single geostationary satellites to networks of interconnected low-Earth orbit satellites. As such, launch must shift from an inhibitor of the trend to an enabler of that trend. To do so, cost must come down as launch vehicle production rates improve.

Competitiveness: This refers to a potential partner's ability to competitively provide proposed goods or services. Teledesic is not a manufacturer of satellites or other equipment. As such, we are free to choose the most capable and competitive partners. The fact that we are not manufactures enables us to objectively evaluate our potential industrial partners. With respect to launch services providers, this means a recognition of the fact that historically the markets for launch services have been largely inelastic. If a service provider

reduced its price by 50%, they did not get four times the business, their revenue was simply cut in half. There was effectively no incentive to become competitive. We believe that is changing.

Teledesic is not the last of these low-Earth orbit satellite systems. Launch service providers who improve their competitiveness will not only capture a large portion of Teledesic's business, but also, will be in a preemptive position to capture new business.

3. What is the single most important improvement that could be made by U.S. launch service companies in order to attract your business?

   The launch industry is undergoing a fundamental shift: from a nationally-focused, government-dominated market to a global, commercially-driven market. No longer is capability at any cost a driver. Demand in the commercial marketplace is elastic. Customers expect reliable service from reputable providers at competitive prices. Competitiveness spurs innovation. One of the most important improvements the U.S. launch industry could make is to embrace and accelerate the pace of this transition. U.S. industry leads the world in technology deployment and innovation. There is no reason this innovation cannot be applied to the launch services industry.

4. You state in your testimony that the EELV and RLV initiatives may be "too little, too late". Further, that the programs are receiving large subsidies that will most likely preserve the status quo. Should the RLV program be restructured. If so, what would be the optimum structure ?

   In the commercial environment, product development is an investment. The reward for successful, cost-effective product development is more business.

   In the government procurement environment, new product development is a profit center in and of itself. As long as someone else is funding development, there is little incentive to innovate on your own. To the extent that the EELV and RLV programs reinforce development as a profit center they reinforce the status quo.

   With respect to RLV, we applaud the overall cost and launch rate goals. However, the current program is structured to spend over $1B to develop a sub scale mock-up that has no operational value! It's been said that this is like building thousands of parts the wrong size. Based on the current schedule, RLV will not be available until the 2005 time frame -- too late to have an impact on our launch plans. Going directly into operational development could make the RLV available years sooner ---and make it a part of our launch plans.

The timing of the EELV program is much better suited to Teledesic's planned launch schedule. We plan to work with the USAF and EELV contractors to evaluate the ability of EELV to satisfy some of Teledesic's launch demand. Both government and commercial users alike share a common interest in seeing reliable, low-cost space access become a reality. We hope that EELV makes a significant step in that direction.

5. What have the launch trade agreements with China, Russia, and Ukraine actually accomplished for the U.S. launch industry? Have they leveled the playing field and encouraged market practices?

6. How can launch trade agreements with the non-market economies be enforced with harming the competitiveness of the U.S. satellite industry?

   Questions 5 and 6 are best addressed together. The launch industry is undergoing a fundamental shift (as indicated in our response to question 3). It is moving from a government-dominated, national market delivering capability at any cost to a global, commercially-focused market demanding high quality and reliability at competitive prices. In our opinion, the current launch agreements strike a nice balance in supporting the U.S. industry during the early stages of this transition while allowing flexibility to accommodate systems like Teledesic, whose launch demands fundamentally change the current demand projections for launch services.

   Ultimately, we believe in free and open trade. U.S. industry has shown time and time again that it can be competitive on a global basis with anybody. Boeing, Chrysler, Ford and Hewlett Packard are a few examples of U.S. companies that compete in some of the most brutally competitive and subsidized markets in the world. In the long run, quotas encourage a "harvest mentality" and stifle the creativity and innovation that is so uniquely U.S.

7. Are U.S. export controls a significant factor when U.S. companies are trying to win satellite contracts from international customers?

   Given that we are not a satellite manufacturer, we do not have much insight into the impact of U.S. export controls on international satellite business.

8. What should be the long-range goal of these launch trade agreements?

   As stated in the answer to questions 5 and 6, the goal of any agreement that stops short of free and open trade should be to eliminate itself over the long run.

K0361

SPACEPORT FLORIDA AUTHORITY
MEMORANDUM

DATE: August 4, 1996

TO: Eric Sterner
Subcommittee on Space & Aeronautics

FROM: Edward A. O'Connor Jr.
Executive Director

SUBJECT: Response to Rep. Sensenbrenner Questions for Congressional Record

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Thank you for providing an opportunity for late submission of our response to Mr. Sensenbrenner's questions of June 12, 1996. The Spaceport Florida Authority provides the following responses:

Question #1

Do you envision different rules and regulations applying to different spaceports, or should they all be treated the same?

Yes, different rules and regulations should apply to the different existing spaceports, depending on whether they are a commercial activity or a state government activity. We believe that a single regulatory framework can be established that meets the varied requirements of the space transportation industry, including spaceports. Currently spaceports have been created in two distinct forms. The first spaceports were created as a function of state government. Spaceport Florida, the Alaskan Spaceport, the Virginia Spaceport and the New Mexico Spaceport followed substantially the same form. All were created by state law, received state funding, and are governed by the state procurement rule. Consequently, spaceports are subject to state government policy similar or identical to those required for the operation of public airport authorities. Because these spaceports are subdivisions of state government, they require recognition by Federal Agencies if they are to be able to provide new launch infrastructure capability at the national launch sites.

In the case of Florida, the state has appropriated over 5 million dollars for investing in the conversion of unused launch facilities at Cape Canaveral Air Force Station. The Air Force and the Department of Transportation have frequently been unable to accommodate the presence of a state agency in the process of providing new infrastructure. The problem arises in large part as a result of the failure of the CSLA to specify the type of relationship permitted between the state agency and the Federal government.

Currently, the launches of military programs from Cape Canaveral Air Force Station comprise less than 20% of the total launches and the introduction of new commercial programs are forced to follow a military system for permission to use facilities and conduct operations. The support agreements being developed by the Air Force for use of facilities frequently seems to deviate from the intent of the CSLA These deviations will impede the development of new launch systems that can successfully compete in the world market and provide more cost competitive launch capability for U. S. government requirements. In the case of the California spaceport, they have chosen to develop a commercial company that seeks to provide launch facilities. This form is currently included under the terms of the CSLA.

Question #2

See answer to Question #1.

Question #3

How could this Congress explain to the public that it is providing funding for your activities, which are supposed to be in support of commercial objectives?

Launch ranges are a public transportation infrastructure that serve both government and commercial users. Thus, they are the space launch equivalent to air traffic corridors and air traffic control systems, which are managed and funded by the federal government to ensure the safety and operability of our nation's air transportation systems. This significant investment is necessary to allow the flow of commerce and defense utilization. The launch ranges represent the same type of transportation infrastructure.

In addition, it should be noted that every federal dollar received by Spaceport Florida has been matched by state funding. The improvements and modifications provided under the grant program can be directly traced to cost savings benefiting federal agencies who utilize these launch facilities.

Question #4

By "the nation's launch ranges," are you including facilities such as Alaska's spaceport, or do you mean only existing government ranges?

We believe that existing government ranges are sufficient to meet the nation's space transportation requirements. Alaska's spaceport and other such spaceports can, where feasible, use the capabilities of existing ranges, or should demonstrate to the federal government that their flight operations can be safely conducted through the use of alternative tracking techniques and coordination with existing FAA air traffic management systems.

Question #5

Should Alaska's spaceport, or those proposed by other states where government does not now have launch sites, have to pay their own operating costs?

Yes. However, the federal government should provide these spaceports with competitive access to infrastructure matching grant funds and under-utilized equipment, in the same way that such funds and equipment are available to airports, seaports and transit systems and roadways.

Question #6

What have the launch trade agreements with China, Russia, and Ukraine actually accomplished for the U.S. launch industry? Have they leveled the playing field and encouraged market practices?

Part One -- The agreements have benefited the satellite industry much more than the U. S. launch industry. U. S. launch vehicle manufacturers that have teamed with foreign providers will profit from deal-making, but not from the domestic manufacture of hardware, and not from the conduct of launch operations from U. S.

soil. The launch industry work force at Cape Canaveral and Vandenberg will also suffer, unless foreign vehicles are to be launched from U. S. spaceports.

Part Two -- The agreements have not leveled the playing field. By transferring market share to foreign providers, they have discouraged U. S. investment in commercial launch vehicle improvements.

Question #7

How can launch trade agreements with the non-market economies be enforced without harming the competitiveness of the U.S. satellite industry?

The competitiveness of the satellite industry was a central factor in the crafting of the agreements. Strict enforcement was assumed when they were crafted and should be required throughout the terms of the agreements.

Question #8

Are U.S. export controls a significant factor when U.S. companies are trying to win satellite contracts from international customers?

We are not qualified to answer this question.

Question #9

What should be the long-range goal of these launch trade agreements?

The long range goal of the agreements should be to transition the non market launch service providers to true open competition based on normal market mechanisms. If the agreements are not enforced, I would expect that launch services would continue to be provided without regard to normal market equality. Without equality there is no incentive for domestic launch vehicle providers to invest in new vehicles. They will continue to support expensive development programs funded by the DoD with limited or no commercial long term viability.

SFA-96-339:ele

ALASKA AEROSPACE DEVELOPMENT CORPORATION

July 26, 1996

The Honorable James Sensenbrenner, Jr.
U.S. House of Representatives
Committee on Science
Suite 2320 Rayburn House Office Building
Washington, DC 20515

Dear Congressman Sensenbrenner:

Alaska Aerospace Development Corporation (AADC), a state agency, appreciated the opportunity to testify before your committee concerning commercial space. We also welcome the opportunity to respond to some questions that are of great concern to AADC in the development of the Kodiak Launch Complex (KLC). The KLC is different from the other spaceports because it will not be located on or adjacent to a Federal Launch Range.

The following is a list of your questions and our responses:

Do you feel that there is a requirement for a new Federal Agency such as a national range manager, or is the Department of Defense capable of providing the Service?

If it will bring equality to spaceports, yes! The spaceports located on Federal launch ranges are receiving subsidies. This is totally unfair. None of the spaceports are entities of the Federal Government and are all competing and should all be treated equally with regards to range safety equipment and support services. To date an equitable distribution of national range infrastructure, support, and services has not occurred. This is after several studies have shown the need for more launch infrastructure (spaceports) to support the growing commercial space industry.

- *Is such a range management function, performed by DoD, desirable, or is there an existing agency suited?*

It should not be needed if these agencies made an effort to assist everyone equally. However, subsidies do exist for some and place some spaceports in a competitive advantage. This function could be performed by either DoD or NASA. It would provide equality for all

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spaceports and a quality product for DoD, NASA and commercial space. However, legislation will have to be enacted in order to ensure equality for all. However, Alaska is opposed to OCST providing this function.

As a new undertaking, Kodiak Island does not have the benefits of existing infrastructure that other proposed spaceports have.

- *How does this affect your ability to be competitive with those spaceports?*

It greatly affects the Kodiak Launch Complex's ability to compete and it greatly impacts the future of commercial space. The KLC will be the first launch site that is not on or near a Federal launch range. It will be a safe operation but it will be free from the cumbersome and often bureaucratic operating procedures of the Federal ranges. This will provide commercial launch providers almost complete control of their operation which will ensure their profit margins. A range safety system is one of the prime requirements for a spaceport. It is a major investment requirement. Access to range safety support can be a major competitive edge for those spaceports located on or near a Federal range. However, none of the spaceports are entities of the Federal Government and the range equipment and support provided to the spaceports should be provided to all spaceports equally. All of the spaceports are competing. There is enough excess range safety equipment in the DoD and NASA to provide this capability. This would expand the launch infrastructure plus provide additional capability for the DoD. A viable Kodiak Launch Complex will provide a much needed backup capability to Vandenberg in case of a natural disaster or a change in the world peace.

Unlike the representatives of the Florida and California spaceports, you are asking for less Federal involvement in your plans. In fact, you seem to want the Federal government out of the picture entirely, except for an advisory role to the state government. Is that a correct assessment, or do you see a role for the Federal government in Alaska's spaceport?

Alaska would welcome genuine assistance from the Federal agencies. So far, Alaska has received every hindrance and roadblock placed in front of the development of the KLC. It almost appears that there is a concerted effort to ensure that the KLC does not get developed. This is after the state has allocated over $3.0M into the program and studies from OCST show that if the predicted commercial space market occurs that there is insufficient launch infrastructure to support it. For instance, funds were provided to the Air Force for spaceport infrastructure development ($20M total). This grant program was totally biased and unfair. Alaska proposed to use the funds for

infrastructure development but only received $1.85M out of the $20M grant program even though greater awards were made for studies. On the other hand, NASA was authorized a $3M spaceport grant in FY96. They recently announced the results of that competition and it appears that it was done in a fair and equitable manner.

The attitude we have received is that we are a threat to someone's current sandbox. We have witnessed different standards. It seems that we always get a hundred reasons why we cannot do something rather than trying to help us find one reason to allow something to be done.

Alaska thinks that the licensing process should be delegated to those states that have the demonstrated expertise and the desire to license their own spaceport operations to include the environmental requirements. OCST should review the proposed mission and issue the launch license minus the environmental considerations.

How can this be remedied?

• *For example, do you want the federal government to provide range support services, as Florida and California do? If not, who will pay for and provided those services? Who will certify that your range safety systems and procedures are adequate to protect public safety?*

Range safety equipment and support services should be provided to all spaceports on an equal basis and at the same cost. If the federal government provides range support services to the other spaceports, then Alaska expects the federal government to provide the range safety equipment and support services at the same cost. This can be done either by the USAF or NASA. Either one of these agencies will certify the range safety system. The inequality puts the KLC at a competitive disadvantage. Since none of the spaceports are Federal entities, each spaceport should have the same price advantage for the use of the range safety equipment and services.

• *Do you want direct federal funding for infrastructure development, tax exempt bonds, or grants, as other spaceport representatives request?*

The spaceports that were created by state statutes already have the capability and authority to issue bonds. Any future infrastructure grants that are federally funded should be provided to the spaceports on an equal basis as it appears that NASA has recently accomplished. The two previous USAF grants were a sterling examples of bias and unfairness.

• ***Do you anticipate DOT retaining its role in licensing the launch itself, or do you see that authority being transferred to the state as well? If you want that transferred to the state, how would the United States comply with the United Nations treaties that hold governments responsible for launches from their territories?***

The licensing of spaceport operations should be delegated to those states who have the ability and the desire to license spaceport operations. The launch license should be retained by OCST with the exception of the environmental consideration which should be the responsibility of the state and local communities. Again, the states through their licensing and permitting process should be responsible for the environmental analysis process relating to the spaceport operations and the effects of the various launch vehicles on the area. This responsibility should be at the level that it affects--the state and local communities.

State Spaceport Authorities have extensive statutes covering the operation of those organizations. They have Boards of Directors who have varied experience including local and state government experience, commercial aerospace, and private business. The Spaceport Authorities' personnel have extensive backgrounds and experience in space launch, satellite development and range safety. Spaceport Authorities have numerous support contractors with experience in all aspects of launch operation, launch vehicle and payload processing, ground and flight safety, environmental, etc. Further, the contractors who support the spaceports are active in the day-to-day conduct of launch services.

The Commercial Space Launch Act of 1984 amended in 1988 was enacted at a time when there were no Spaceport Authorities. However, Spaceports are here and they are staffed with personnel and contractors who are current in these activities. Some states have enacted State Statutes establishing State Spaceports and regulations regulating their activities. The operation of launch activities are well established and there are adequate state oversights using the permitting process as well as Federal regulations like Clean Water, Clean Air, OSHA, etc. that states and organizations are required to follow.

The OCST could retain the review responsibility pertaining to treaty compliance.

What have the launch trade agreements with China, Russia and Ukraine actually accomplished for the U.S. launch industry? Have they leveled the playing field and encouraged market practices?

No input.

How can launch trade agreements with the non-market economies be enforced without harming the competitiveness of the U.S. satellite industry?

No input.

Are U.S. export controls a significant factor when U.S. companies are trying to win satellite contracts from international customers?

No input.

What should be the long-range goal of these launch trade agreements?

No input.

Would you please describe the degree of involvement you have with minority and women entrepreneurs in your particular business?

AADC maintains a continuing relationship with several Alaska native corporations, some of which have expressed an interest in participating in the development of the KLC. AADC's Washington, DC based legal representation is performed by a woman-owned sole proprietorship. AADC also has an ongoing aerospace mentorship program that has been predominantly attended by female students showing a keen interest in aerospace careers.

Sincerely,

Pat Ladner
Executive Director

Western Commercial Space Center, Inc.
The California Spaceport Authority

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25 July 1996

Congressman F. James Sensenbrenner, Jr.
Chairman, Subcommittee on Space and Acronautics
U.S. House of Representatives Committee on Science
Suite 2320 Rayburn HOB
Washington, DC 20515-6301

Attn: Rich Stombres

Dear Mr. Chairman:

Thank you for the opportunity to amend the transcript of my statements to the Committee on 12 June 1996 and to answer the additional questions by yourself and Congresswoman Jackson-Lee.

In my last answer to Congresswoman Jackson-Lee's question in the transcript page 126 I meant to say that, "There are not many people in the world foolish enough to invest in a non- profit corporation as I have, but she supported me in this decision."

In answer to your additional questions:

Q You envision a strong federal government role in your spaceport operations, particularly range support services. By contrast, the Alaska spaceport representative wants the federal government to have almost no role.

- Do you envision different rules and regulations applying to different spaceports, or should they all be treated the same?

A In California there is a general consensus between industry, legislators, Administration officials, local community representatives, and the California Spaceport Authority that spaceport regulations should be held to a minimum and be primarily safety and national security requirements. The State of California is not in favor of more regulatory agencies in its structure, and envisions commercial space regulations coming from a single federal agency so equality between spaceports can be established without a new burden on states.

Q The Florida and California spaceports are being built upon the foundation of existing government launch sites, whereas Alaska's is being built from scratch.

- Is this a valid reason for treating them differently, or should they have to follow the same regulations, and presumably benefit from the same government subsidization?

A Not only are there differences between the structure of Alaska's spaceport and California's spaceport, but within California there are three different launch support locations; the California Spaceport at Vandenberg AFB, Boeing's Sea Launch facility at Long Beach and the X-33 facility in Lancaster. All these "spaceport" like operations, whether state designated or totally privately funded, should be treated the same from a regulatory viewpoint. However, due to the fierce international competition and the enormous government subsidies flowing to other international spaceports, U.S. Government subsidization is going to have to be managed carefully to invest scarce United States dollars in the most effective and internationally competitive way. With the support of Congresswoman Andrea Seastrand, I have proposed that a National Spaceport Act define state designated spaceports in a manner consistent with airports and seaports, with the same federal tax and funding benefits. In addition, I believe a spaceport infrastructure development grant program, similar to the Interstate Highway Program, should be established by the federal government. Initial funding, on the order of $20 million per year for five years, to be borrowed from the Airport Trust Fund and paid back by a users' tax set by Congress and imposed on the ultimate user of the service provided by the spaceborne system; e.g. direct TV subscriber, satellite telephone owner, space based information service subscriber, et cetera.

Q You advocate that the federal government make every effort to encourage foreign launch service companies to launch from the United States.

- What effect do you think that would have on the U.S. launch services industry?

A My initial recommendation, made at the 29 November 1995 State Department meeting held to discuss state concerns about the Ukrainian bilateral launch agreement, was that the U.S. stipulate that a major (50%) part of any number of launches of foreign boosters agree to be conducted from U.S. spaceports. Subsequently, I have added that such foreign booster launches at U.S. spaceports be conducted under U.S. company sponsorship. Several U.S. companies have already established agreements with foreign booster manufacturers. I believe that this will stimulate the U.S. launch services industry to incorporate the best worldwide technology, lower the now prohibitive space launch cost, and attract satellite and on-orbit service companies to the spaceport states with the lowest costs.

- If launching from U.S. launch sites is so attractive to the satellite manufacturers you have approached, isn't that an incentive for them to buy U.S. launch services?

A The interests of satellite manufacturers and on-orbit service providers need to be separated. They are no longer the same. Communication companies that buy satellites from other companies and then sell their communication service to other countries often make deals

with those foreign governments for launches on that country's boosters as a quid pro quo to use that communication service. This increases the satellite manufacturer's problems. In addition to having the satellite design incorporate a foreign booster interface design, the manufacturer must also be able to work with the foreign government's strange, and often damaging, processing practices and bureaucratic infrastructure. The satellite manufacturer's costs go up operating in a foreign country and the potential for loss of proprietary technology increases greatly. All manufacturers I have talked with would much prefer to launch from U.S. launch sites if launch costs were comparable.

- Would your proposal undercut the U.S. launch services industry?

A My proposal would not undercut the U.S. launch services industry. On the contrary, it strengthens it

- Would it constitute government interference in the market?

A Government interference in the market? It is my understanding that both Russia and China have indicated they will not continue any bilateral launch agreements beyond the year 2000. Here in California, we are trying to position ourselves to become the leading business space faring state in the world. In order to accomplish this, California has just approved $3 million in grant matching funds in the State budget to develop the components of a "commercial space highway system" that will provide the non-space business community the ability to put their service or manufacturing operation in low earth polar orbit at the lowest possible cost. The next goal of the California Spaceport Authority is to promote the development of an integrated space transportation industry so that the overall cost of doing business in space, including the cost of booster, satellite, on-orbit control and recovery, will be the lowest in the world. With the vast majority of the world's space business slated to take place in polar orbit, California is in the ideal position to become "The Gateway to Planet Earth" as Dr. Paul Estey of AMROC said in 1992.

Q You ask that the federal government transfer surplus ICBMs and IRBMs to designated spaceports.

- Are you proposing that the spaceports would, themselves, become launch service providers using these excess government missiles in competition with companies that offer small launch vehicles?

A When I recommended that all excess ICBMs and IRBMs be transferred to state-designated spaceports, I was referring to state spaceport authorities. First, I have recommended in the National Spaceport Act that all fifty states be given the opportunity to develop a spaceport authority even though Single Stage To Orbit (SSTO) capability may be fifteen to twenty years off. If every state chose to implement a spaceport authority, then the 500 surplus Minuteman IIs could be distributed ten to a state. Second, the limitations for use by the recipient states would include that they be used only for educational programs without the funding for the purchase of

commercially available boosters. Third, to satisfy the START treaty requirements, all launches would be conducted under the auspices of the Air Force Academy, as Dr. Gil Moore is now developing his program.

Under the present situation, the DOD is expected to make the decision as to which educational projects are worth the release of a surplus ICBM. That process killed the plans of the Universities Space Research Association (USRA), a consortium of 80 universities, to fly three student satellites selected by a nationwide competition on three Minuteman IIs out of Vandenberg. I am not proposing that spaceport authorities become launch service providers in competition with commercial booster companies. The California Spaceport Authority has a mandate to promote and develop space education in California. We are in the process of developing a space academy to provide the hands on training for our future launch technicians and engineers. With the abundance of laid off and retired Minuteman II experts here at Vandenberg, our space academy will be well staffed.

The Minuteman II (MM II) is not a threat to any commercial booster. With the appropriate new third stage (developed by Martin under the MSLS Program), the MM II can only lift 390 pounds into polar low earth orbit, while the nearest commercially available booster is optimized at 500 pounds. Our California Spaceport has been designed to accommodate the MM II for military research payloads and educational launches. I can provide you with much more information on this subject and so can UCLA Professor Paul Coleman, President of USRA.

Q You say that the spaceports need Federal funding to develop an "international on-orbit control and safety system world-wide." Please explain what that system is, why it is needed, and how much it would cost.

A The world-wide, on-orbit control and safety system I am recommending is not connected to the spaceports, but to the exploding number of commercial satellites to be placed in low earth orbit over the next few years. Today the Air Force Satellite Control Network (AFSCN), the most sophisticated low earth orbit control system the U.S. has, controls between 90 and 100 active satellites. Within the next five years, commercial communication satellite companies plan to place well over 1000 satellites in low earth orbit. This is ten times the handling capability of the AFSCN. Each company will tell you that they are building their own control system; but who will control the interface between competing systems and how? An Air Traffic Control system for space will be required. My recommendation is that Congress task DOT to define both a system and a proposed budget.

Q You ask for congressional support for your idea that NASA develop a "cheap recovery vehicle" for the X-33 program to support development of manufacturing satellites in polar orbit.

- If there is a market for manufacturing commodities in polar orbit, won't the private sector develop the necessary reentry vehicles for this market sector?
- Why should the government pay for such a vehicle?

A A polar orbit recovery vehicle is an easy spin-off of the X-33 program. The critical element is a lightweight and inexpensive reusable Thermal Protection System (TPS), one of the primary development goals of X-33. Guidance systems are readily available and Rutan can produce the aerodynamic structure we will need. Be assured, sun synchronous will be the orbit of choice for most automated space manufacturing.

Q What have the launch trade agreements with China, Russia, and Ukraine actually accomplished for the U.S. launch industry? Have they leveled the playing field and encouraged market practices?

How can launch trade agreements with the non-market economies be enforced without harming the competitiveness of the U.S. satellite industry?

Are U.S. Export controls a significant factor when U.S. companies are trying to win satellite contracts from international customers?

What should be the long-range goal of these launch trade agreements?

A The launch trade agreements have been focused on the equatorial launches for geostationary satellites. This is of little interest to the California Spaceport with only polar orbit capabilities, but of great benefit to California because of our four major satellite manufacturers and the introduction of a new space launch venture (Sea Launch) based out of Long Beach Harbor. From the California Spaceport Authority viewpoint these agreements are transitory and have the benefit of providing government-to-government dialog on space business, the medium of future world-wide competition.

Q From Hon. Sheila Jackson-Lee.

- Would you please describe the degree of involvement you have with minority and women entrepreneurs in your particular business?

A The Western Commercial Space Center, designated by State Legislation as The California Spaceport Authority, has a very grassroots beginning. During our seven year period of development, I was fully financed and supported by my wife, Ms. Patricia Fresh, president of Moonspace Corporation. It was her funds and her company resources that allowed my dream of commercial space in the West to grow. In addition to being a woman-owned corporation, Pat is also a Native American.

Within The California Spaceport Authority, we are currently a staff of two paid positions and two volunteers, including myself. Our two paid employees are both women. Our office manager, Ms. Eleanor Potts, has been employed for two years and our director of external affairs, Ms. Jana Bott, was the first paid employee of our corporation. While balanced with experience, dedication and ability, the hiring of minority and women is also a consideration in our company.

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experience, dedication and ability, the hiring of minority and women is also a consideration in our company.

During our first two years in existence, WCSC/CSA had a Technical Advisory Panel of local companies participating in the development of the commercial space industry. Of the companies on this Panel, three were minority/women owned businesses.

My closing comment concerns the need for Congress and the Administration to unhook from the NASA view of future space activities. NASA is a great research organization, but business economics will determine the future activity in space. If the U.S. does not take the lead in developing the space transportation, on-orbit control and recovery infrastructure for business to thrive then it will thrive in China and India, and the U.S. will be purchasing services from them.

Sincerely,

Donald D. Smith
Executive Director

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